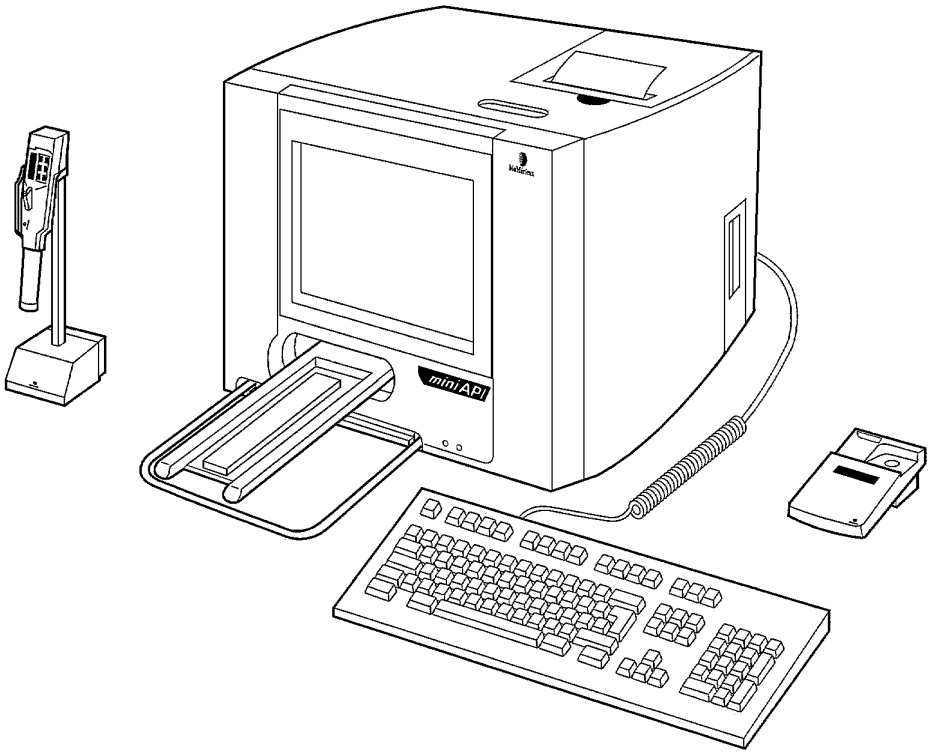
Product No. 99 819

Version A

mini API

Service Manual



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CHAPTER 1

HOW TO USE THIS MANUAL

INTRODUCTION

This chapter explains how to use the ***mini API*** Service Manual.

It is structured as follows:

	Page
SCOPE OF THE MANUAL	1-4
FINDING TOPICS AND PROCEDURES	1-5
HOW THE MANUAL IS ORGANISED	1-6

SCOPE OF THE MANUAL

The ***mini API*** Service manual is designed to enable the Field Service Engineers involved in maintenance tasks to accurately diagnose problems in order to repair ***mini API***.

This chapter explains how the manual is organised and how it should be used.

The Table of Contents lists all the chapters the manual deals with. Each chapter is subdivided into sections corresponding to a procedure or a precise description.

The reply to a question can readily be found by referring to the Table of Contents or the Index at the end of the manual.

FINDING TOPICS AND PROCEDURES

The ***mini API*** Service manual is divided into 12 chapters to help you find what you are looking for.

Table of Contents

The main Table of Contents of the manual is located on pages V-1 to V-4. It lists each chapter and the procedures or topics they contain.

List of Figures

Pages V-5 to V-6 contain a list of the figures of the manual.

Chapter Contents

Each chapter starts with a specific table of contents. Each table of contents shows the page from which the different sub-chapters start, on the right of the page.

Page Footers

Each page of the manual has a page footer.

The footers contain the version of the manual and the page number.

Index

A standard topical index is located at the back of the manual in Chapter 12. It is used to locate a particular description or procedure.

HOW THE MANUAL IS ORGANISED

This manual is designed to provide you with step-by-step procedures for proper maintenance of your ***mini API***.

Use this Service Manual when you want background or more detailed information on the ***mini API*** components.

This chapter explains how the Service Manual is organized and how it should be used.

Functional Description

Chapter **2** gives an overview of the ***mini API.***

- Instrument functions
- Instrument operating principle
- Characteristics and specifications

Preliminary Instructions

Chapter **3** describes the installation procedure and the procedure for preliminary controls.

Description of the Modules

Chapter **4** gives for each module:

- Its function.
- The position on the instrument.
- A block diagram.
- Diagrams and technical drawings.
- Procedures allowing you to assemble/disassemble the module.
- Procedures to maintain and repair the instruments.

Maintenance

Chapter **5** describes the customer's schedule for maintenance as well as the ATI maintenance.

General Troubleshooting Guide

Chapter **6** describes all possible failures and gives the decision tree.

Table of Previous Instrument Versions

Chapter **7** gives you the list of different versions in the form of a table. It shows the changes and improvements made, as well as the new instrument serial numbers for each change.

Spare Parts and Tools

Chapter **8** gives the list of specific tools required to perform the adjustments and carry out repairs on the instruments.
It also gives you the list of spare parts.

Diagrams

Chapter **9** gives you the block diagrams for the ***mini API*** cards.

Software Maintenance Specifications

Chapter **10** contains the description of the software maintenance used for the reader.

Glossary

Chapter **11** contains an alphabetical list of terms used in this manual and their definitions.

Index

A standard topical index is located at the back of the manual in Chapter **12**.

CHAPTER 2

FUNCTIONAL DESCRIPTION

INTRODUCTION

The following topics are presented in this chapter:

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• Electrical Characteristics	2-12
• Characteristics of Optical Components	2-12
• Computer	2-13
• Central Processing Unit	2-13
• Software	2-13
• Consumables	2-13

PRESENTATION

mini API is an automatic system for bacterial identification and susceptibility testing. It can be divided into four categories of elements:

- ★ hardware
- ★ software
- ★ consumables
- ★ user's manual

INTRODUCTION TO IDENTIFICATION AND SUSCEPTIBILITY TESTING

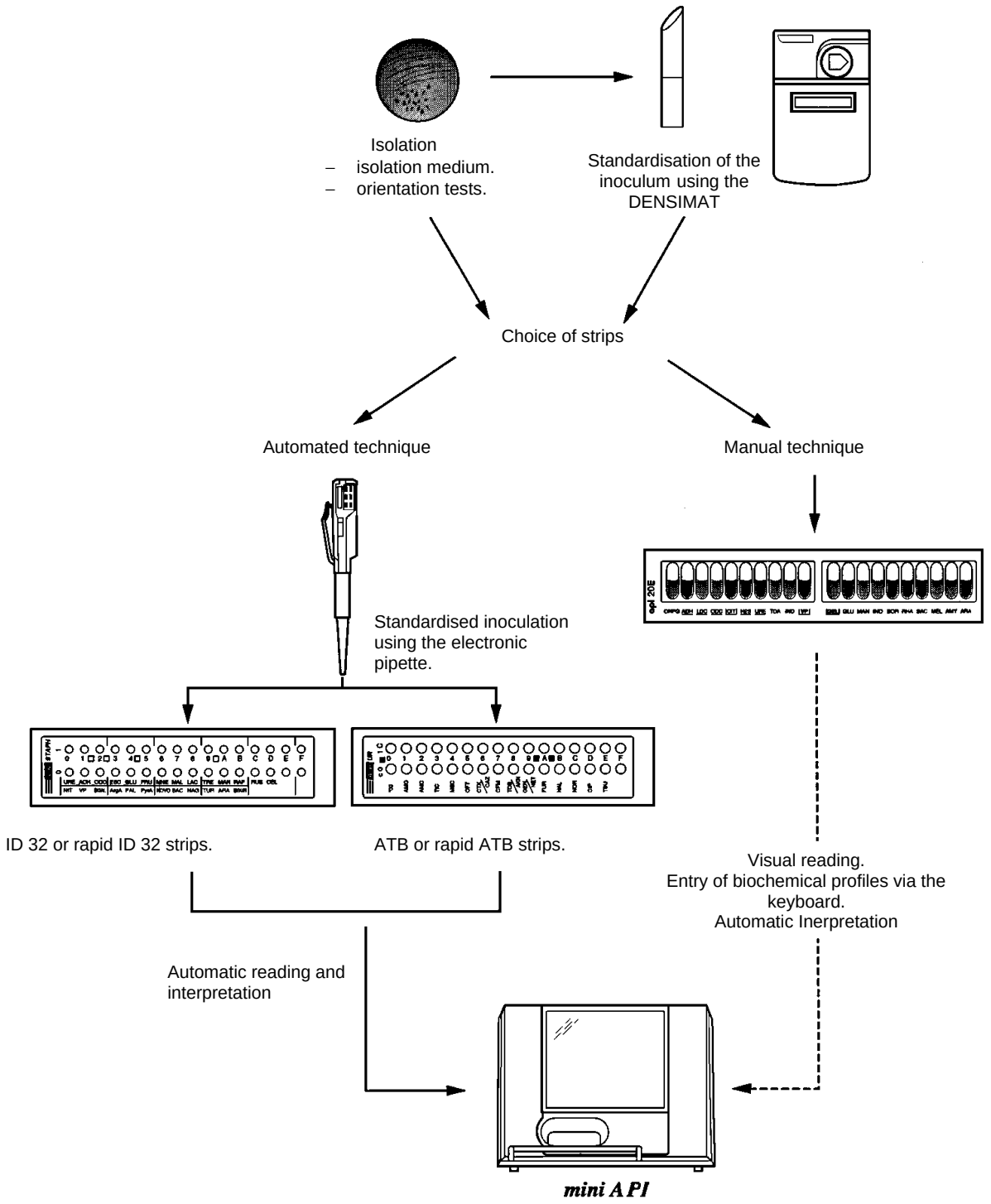


Figure 2-1 Using *mini API*

DESCRIPTION/AIM

mini API is designed for the automatic identification and susceptibility testing of ***ID 32***, ***rapid ID 32***, ***ATB*** and ***rapid ATB*** strips.

It also enables computer assisted interpretation of API strips read visually.

GENERAL DESCRIPTION

Configuration Components

mini API is an automated instrument for identification and susceptibility testing. It consists of:

- hardware,
- software,
- consumables.

Hardware

The package includes:

★ ***mini API,*** a self-contained analytical module enabling:

- reading of test strips,
- management of results and data,
- printing of results obtained.

★ **a *DENSIMAT* densitometer** to standardise the turbidimetry of the bacterial suspension (please refer to the manual supplied with the densitometer).

★ **an electronic pipette** to dispense the required amount of bacterial suspension into each cupule of the identification and susceptibility test strips (55 µl or 135 µl) (please refer to the manual supplied with the pipette).

Software

The ***mini API*** software enables:

- interpretation of data,
- interpretation of strip results (identification or susceptibility tests),
- expert analysis of susceptibility tests,
- storage of results on the hard disk,
- printing of results,
- extraction of data,
- connection with a central computer.

Consumables

The ***mini API*** consumables include:

- strips with associated media and reagents (see package inserts),
- ribbons and paper for the printer,
- pipette tips.

2-2 Reading Principle of the Test Strip Reader

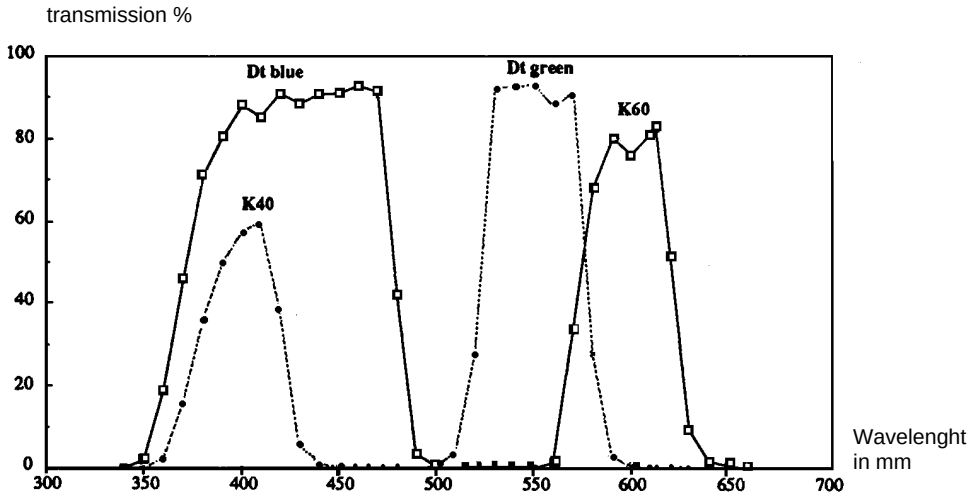


Figure 2-2 Description of the Spectral Zone

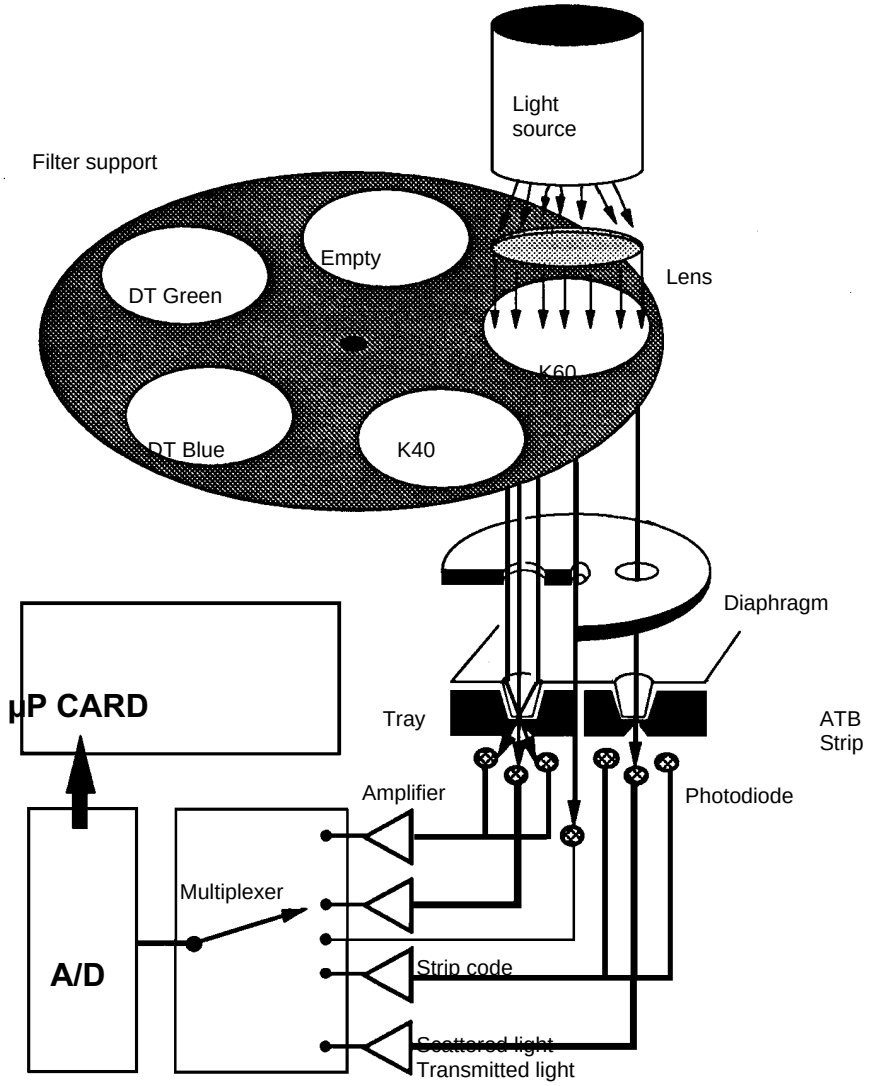


Figure 2-3 Reading Principle of the Test Strip Reader

PRINCIPLE OF OPERATION

Functions

- Strip identification by strip decoding.
- Two types of readings:
  - turbinephelometric
  - colorimetric.
- Communication with the computer.

Presentation

- Black strip carriage.
- Blue protection rail.

Characteristics

- Description of the spectral zone.
- Reading principle of the test strip reader :

★ *Turbinephelometric reading*

Turbinephelometric reading is used for test strips containing assimilation tests:

* e.g. ID 32 GN, ID 32 C, ATB UR.

A turbinephelometric reading cycle occurs in two stages:

1) Entry of the strip carriage.
   Detection of the strip code.
2) Measurement without a filter.
   Exit of the strip carriage.

At the end of the cycle, the result is transmitted to the computer.

★ *Colorimetric reading*

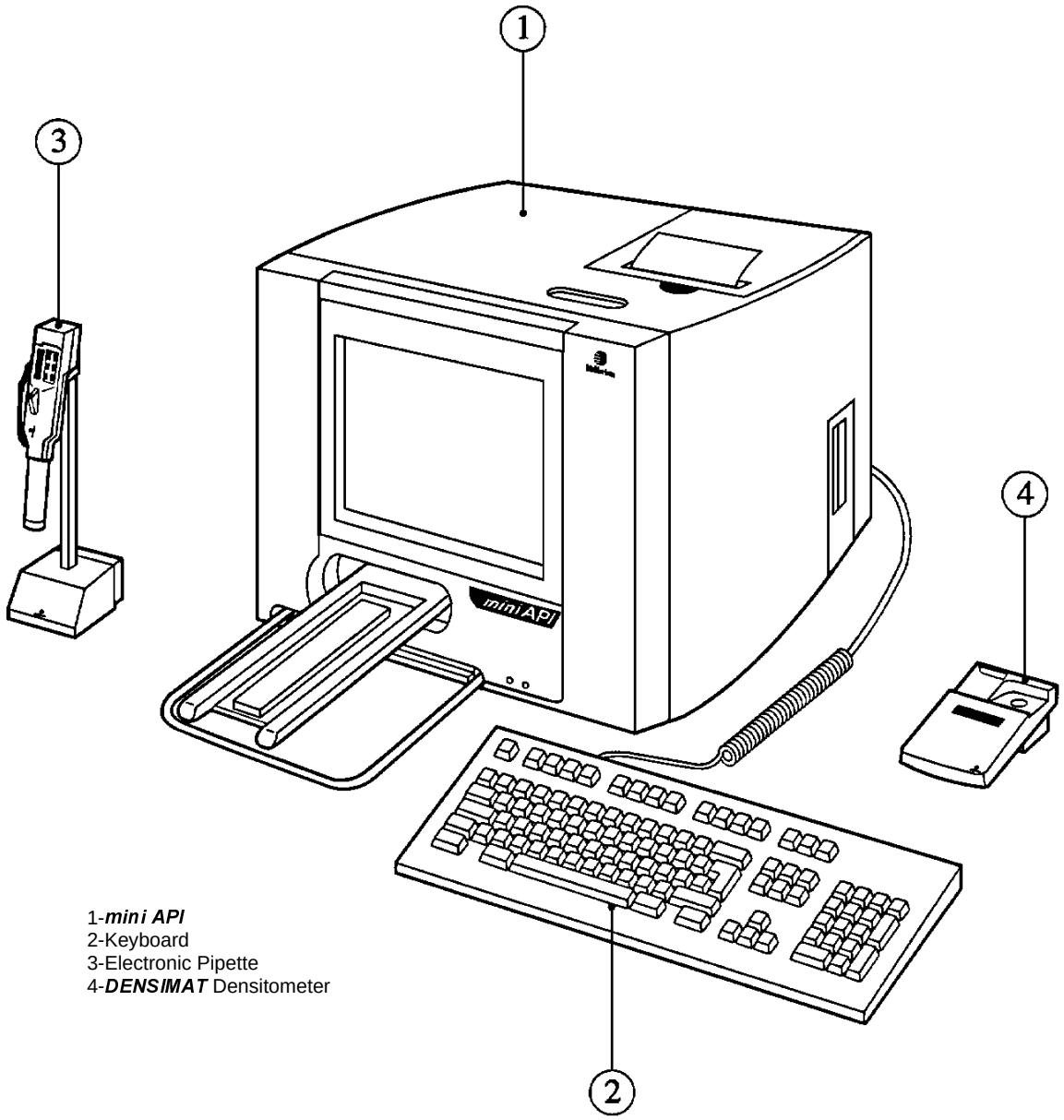
Colorimetric reading is used for strips containing chromogenic substrates:

* e.g. ID 32 STAPH, rapid ID 32 A, rapid ID 32 E

A colorimetric reading cycle occurs in 4 stages:

1) 1st entry of the strip carriage:
   Detection of the strip code,
   Measurement under a K60 filter.
2) 1st exit of the strip carriage:
   Measurement under a K40 filter.
3) 2nd entry of the strip carriage:
   Measurement under a DT blue filter.
4) 2nd exit of the strip carriage:
   Measurement under a DT green filter.

At the end of the reading cycle, the result is transmitted to the computer.



1-***mini API***
2-Keyboard
3-Electronic Pipette
4-***DENSIMAT*** Densitometer

Figure 2-4 Configuration Components

GENERAL CHARACTERISTICS

Environmental Conditions

Operating Temperature

+ 15° C to + 30° C (59° F to 86° F).

Relative Humidity

10 to 70%, without condensation.

Maximum altitude for installation

3000 m

Type of installation

Indoor, light industrial.

Degree of Pollution

No. 2

Safety regulations are respected under environmental conditions defined in paragraph 1.4 of the IEC 1010.1: 1990 and amendment 1: 1992.

Physical Features

Dimensions	*Instrument paked*	*Instrument alone*
Height:	50 cm (19.7 inches)	34.5 cm (13.6 inches)
Width:	60 cm (23.6 inches)	43 cm (17 inches)
Depht:	65 cm (25.6 inches)	- Protection rail in 46 cm (18.1 inches) - Protection rail in 63cm (24.8 inches)

Mass	*Instrument paked*	*Instrument alone*
	32 kg (70.41 lb)	25 kg (55.11 lbs)

Electrical Characteristics

Class I Equipment

Power Supply

100 - 240 VAC

The power supply is self-switching.

Consumption

Maximum 2 A from 90 to 120 V AC

Maximum 1.1 A from 220 to 240 VAC

Frequency

50 - 60 Hz

Power

Maximum 240 VA

Safety fuse

External (power input block)

3.15 AT - 250 VAC

Characteristics of Optical Components

Light source: Halogen 12 V 20 W

- Central photosensor: BP W21
- Side photosensor: SD 5421
- Strip decoding: BP W34

Computer

The purpose of the computer is to control the reader and interpret data by means of the software.

It is connected to the reader to ensure automatic analysis of the strips. It is equipped with peripherals for printing and archiving the files.

Presentation

- a Central Processing Unit,
- an external Keyboard,
- a Monitor,
- a Floppy Disk,
- an integrated Printer,
- a parallel Port/serial Port.

Central Processing Unit

Characteristics

– CPU board:	PCM 4860,
– CPU:	ST486 DX2 66 Mhz,
– Floppy disk:	SMD 1340 EPSON 1.44 Mb,
– Hard disk:	M2614 TAU FUJITSU 1 Gb.

Software

A specific application developed under Turbopascal. Its main functions are:

- communication with the reader,
- interpretation of results sent by the reader,
- interpretation of strip results
- storage of results,
- printing of results,
- bidirectional interface with a central computer,
- management of patient files.

Consumables

Strips

Identification strips

* conventional identification with 18 to 24 hour incubation for:

- Gram negative rods
- staphyloccci
- yeasts

* rapid identification with 4 hour incubation at 37°C for:

- enterobacteria
- anaerobes
- streptococci

Susceptibility test strips

- conventional susceptibility tests with two breakpoints and 18 to 24 hour incubation are possible for most organisms of clinical significance.

- ***rapid ATB*** susceptibility tests with one breakpoint and 4-hour incubation are possible for enterobacteria and staphylococci.

Ribbon and paper for the Printer

bioMérieux Paper:	Product no. 99 720
bioMérieux Ink Ribbon:	Product no. 99 721

CHAPTER 3

PRELIMINARY INSTRUCTIONS

INTRODUCTION

This chapter covers the very first steps you need to take before you can use ***mini API***.

Procedures found in this chapter are:

	Page
RECOMMENDATIONS FOR INSTALLATION AND USE	3-4
UNPACKING *MINI API*	3-4
ASSEMBLY AND INSTALLATION	3-5
• Choosing a Location	3-5
• Setting Up the Strip Tray	3-7
• Connections	3-7
• Preparing for Operation	3-7
• Adjusting the Height of *mini API*	3-7

RECOMMENDATIONS FOR INSTALLATION AND USE

In order to facilitate the assembly of ***mini API***, it is recommended to unpack the components and carefully read the instructions below before starting.

CAUTION ! ***Before unpacking the instruments, it is advisable to have previously planned where they will be placed.***

Avoid exposing the equipment to direct sunlight, excessive heat, humidity or dust.

Only power cords and accessories supplied by bioMérieux SA should be used to connect the instruments.

All connections should be performed with the power turned off.

Do not use sockets controlled by wall-mounted switches or power programmers. Power cuts can destroy data in the memories of the computer and analyser.

UNPACKING *MINI API*

Before opening the boxes

- Make sure that no damage has been caused during transportation.

If damage has occurred, make a claim to the transport company and notify bioMérieux SA or your local distributor.

When opening the boxes

- Make sure that all the items in the packing list have been delivered.

If possible keep packaging materials in case the ***mini API*** instruments have to be moved in the future.

CAUTION ! ***Any damage directly or indirectly resulting from the transport of the instrument without adequate containers will not be covered by the warranty or maintenance contract.***

ASSEMBLY AND INSTALLATION

This manual contains information and warnings which have to be respected by the purchaser or the leasor to ensure safe operation and to maintain the instruments in good condition.

WARNING ! ***Any break in the grounding protective conductor inside or outside the equipment or disconnection of the protective ground terminal may render the equipment dangerous. Deliberate interruption of such conductors is forbidden.***

Opening covers or removing components, except those manoeuverable by hand, may give access to parts that can be dangerous if touched.

Prior to any adjustment, replacement, servicing or repair, disconnect the instrument if it has to be opened.

After opening, if it is imperative to switch the instrument on, any adjustment, servicing or repair should be performed by a qualified technician, well aware of the possible risks.

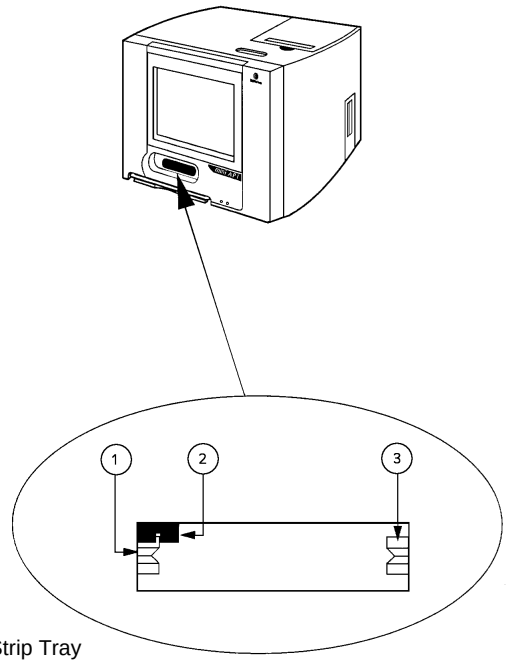
CAUTION ! ***Never load the computer with programs and floppy disks other than those provided by bioMérieux SA. Should this recommendation not be respected, the computer may become a potential computer virus carrier. Any intervention directly or indirectly resulting from the presence of such a virus cannot be covered by the warranty or the maintenance contract.***

Choosing a Location

CAUTION ! ***Avoid exposing the equipment to direct sunlight, excessive heat, humidity or dust.***

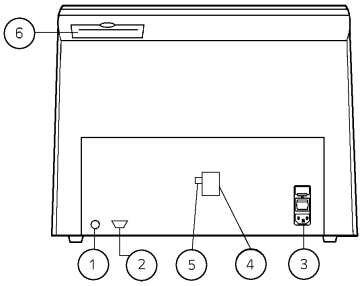
- Place the equipment on a flat stable surface allowing :

– access to the ON/OFF switch,
– access to the disk drive,
– use of the protection rail,
– opening of the printer cover,
– circulation of air.



1-Left-hand Roller
2-Optical Switch for Detection of the Strip Tray
3-Right-hand Roller

Figure 3-1 Settinf up the Strip Tray



1-Keyboard Cable Connection
2-Serial Port for Bidirectional Interface
3-Power Cord Connection
4-Printer Connection Box
5-Printer "Reset" Button
6- Printer

Figure 3-2 Connections

Setting Up the Strip Tray

- Place the strip tray between rollers 1 and 3 and gently push it inside the reader (see Figure 3-1).

Connections

- Connect the power cord to the male outlet on the instrument.
- Connect the keyboard cable (see Figure 3-2).

Preparing for Operation

★ Prior to switching on ***mini API***, make sure that:

– The AC plug is connected to a grounded outlet.

– Spare fuses with appropriate rating and of specified type are available.

IMPORTANT ! ***Using repaired fuses and short-circuiting fuses is prohibited.***

CAUTION ! ***In case of intervention by unauthorised personnel, the Supplier rejects any responsibility and reserves the right to cancel the warranty.***

Adjusting the Height of *mini API*

mini API is equipped with feet allowing its height to be adjusted (two positions). At the time of delivery ***mini API*** is set in the highest position.

To ensure correct functioning of the instrument the feet should be adjusted at the time of installation.

To put ***mini API*** in the lowest position,

- Remove the feet spacers and replace the 4 M5x30 CHC screws with the 4 M5x16 CHC screws delivered with the instrument.

CHAPTER 4

DESCRIPTION OF MODULES

INTRODUCTION

This chapter is structured as follows:

		Page
SECTION 4.1	OVERVIEW	4-5
SECTION 4.2	*MINI API*	4-12
SECTION 4.3	POWER SUPPLY BLOCK	4-24
SECTION 4.4	OPTICAL BLOCK	4-38
SECTION 4.5	MANAGEMENT BLOCK	4-60
SECTION 4.6	BORD INTERFACE SERIAL LCD CPU	4-84
SECTION 4.7	COMPUTER BLOCK	4-92
SECTION 4.8	PRINTER BLOCK	4-116

SECTION 4.1 OVERVIEW

SECTION CONTENTS

This section includes:

	Page
PRECAUTIONS	4-9
TOOLS	4-10
DISASSEMBLY AND ASSEMBLY	4-11

This section describes the functions of each module and gives the positions of the modules on the instrument..It also includes the block diagrams, schematic diagrams, technical drawings and procedures allowing you to disassemble or assemble the modules and make any mechanical, electronic or optical adjustments.

PRECAUTIONS

Take the following precautions before you disassemble or assemble the module.

WARNING ! ***Before disassembling, assembling or adjusting the modules, disconnect the power supply cable from the AC power outlet. Failure to do so may cause physical injury.***

CAUTION ! ***To maintain optimum module operation, use the tools recommended for maintenance work. Adjust each module as described in this manual. Before any of the following procedures can be performed, mini API must be partially disassembled.***

TOOLS

Below is a list of the tools recommended for disassembling, assembling or adjusting the modules. Only use tools that meet these specifications.

Tools	Part No.
2mm Screwdriver	
1.5mm Hex key	
2.5mm Hex key	
3mm Hex key	
4mm Hex key	
5mm Hex key	
5.5mm Wrench	
7mm Wrench	
60W Soldering iron	
Nephelometric kit	99 080
Colorimetric kit	455 0128 A
Screwdriver for adjustment	
Tool cleaner	455 0409 A
Antistatic wrist strap	455 0272 A

Table A- Recommended tools

Description	Specifications
Multimeter (Fluke or equivalent)	
Oscilloscope	20 Mhz
ATB Service software	included in 455 0128 A
Plate of *E. coli*	Customer's own

Table B- Equipment required for maintenance

DISASSEMBLY AND ASSEMBLY

This section describes the procedure for disassembling and assembling the main components of each module. In general, you can install a component in each module by simply reversing the procedure for removing it. Therefore this chapter does not give the assembly procedures for all the cases.

SECTION 4.2 *MINI API*

SECTION CONTENTS

This section includes:

	Page
CABLE CONNECTIONS	4-16
PRINCIPLE OF OPERATION	4-18
• Colorimetric Reading	4-18
• Nephelometric Reading	4-19
REMOVING THE CASING (CASING ASSY) = 452 1040A	4-22

CABLE CONNECTIONS

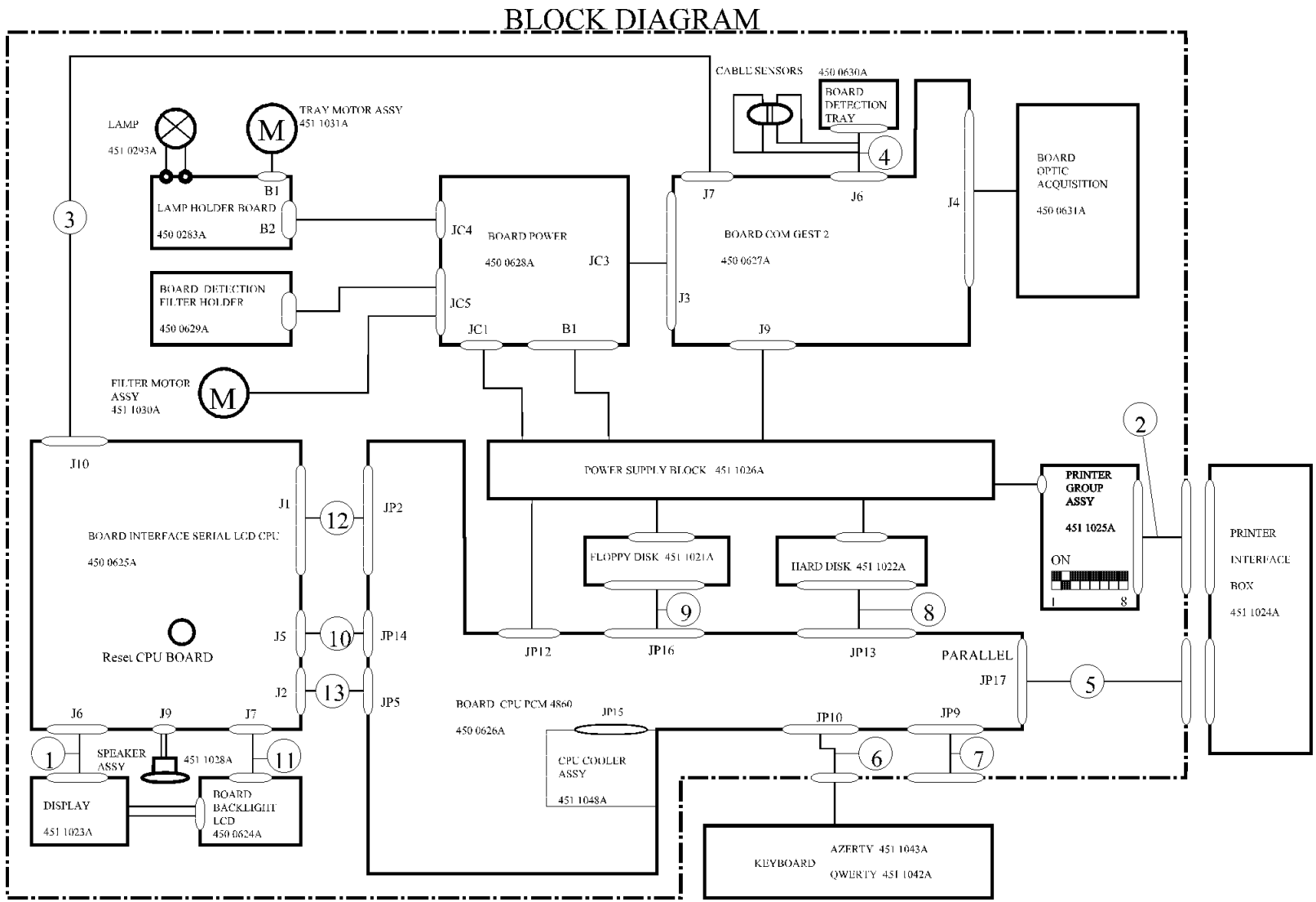


Figure 4-1 Cable Connection

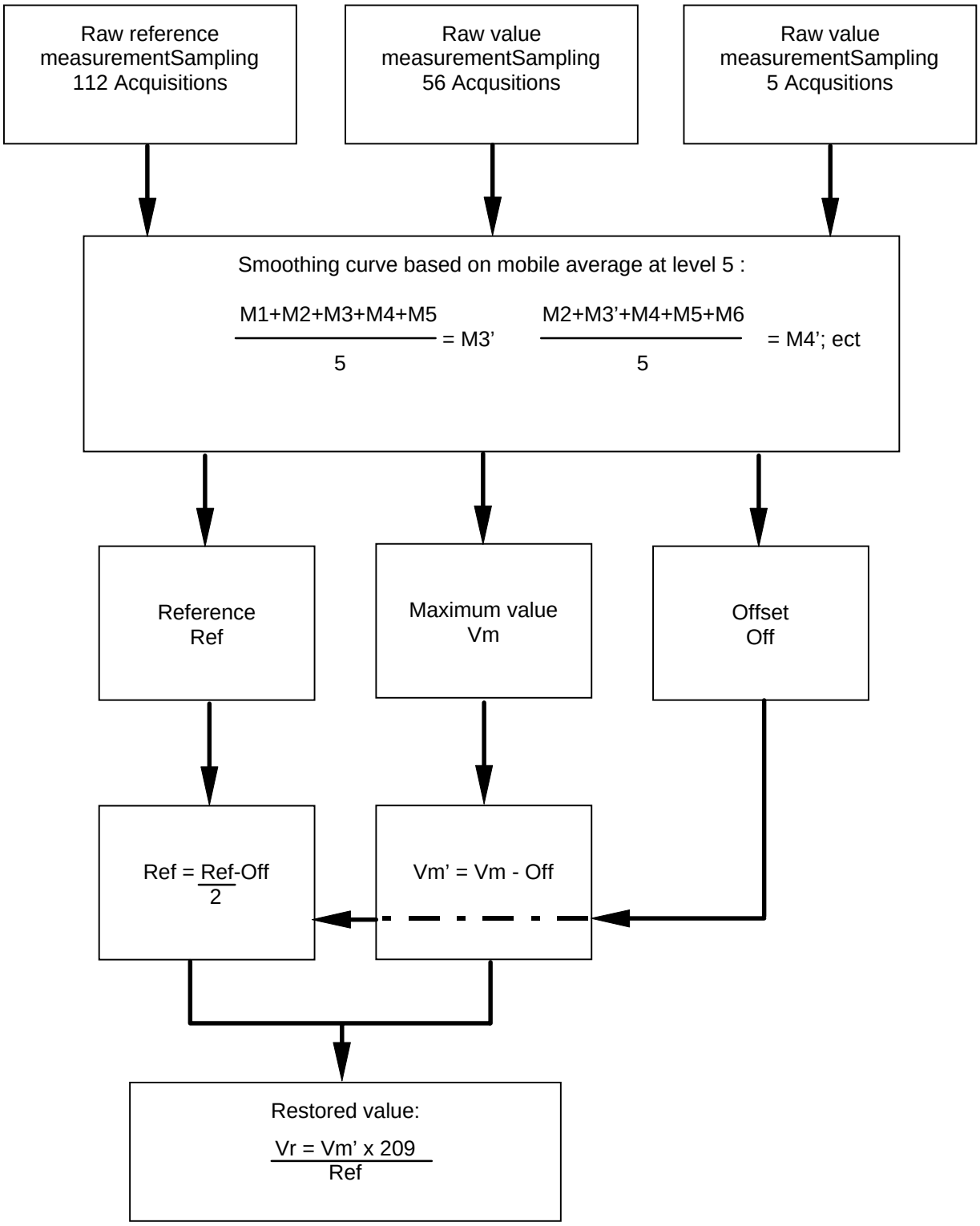


Figure 4-2 Calculation of Numerical Values

PRINCIPLE OF OPERATION

Colorimetric Reading

mini API measures the transmission of light in four regions of the visible spectrum.

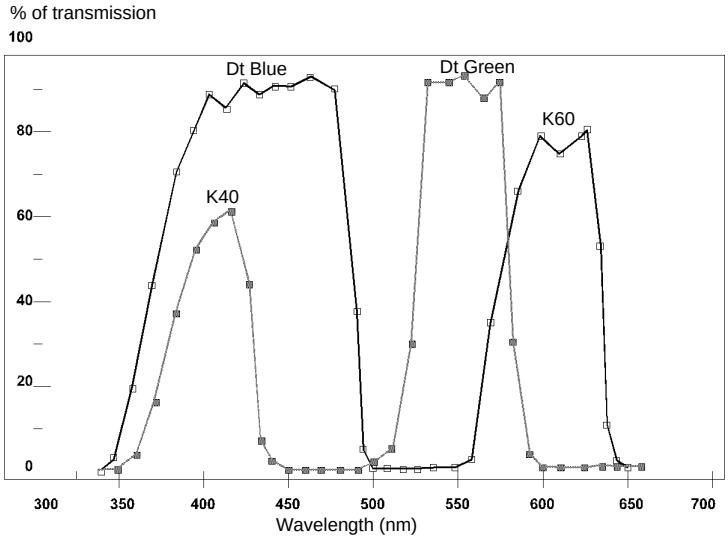


Figure 4-3 Transmission graph

Each biochemical test is characterised by four numerical values obtained at the end of the reading cycle:

1st Stage Under a K60 filter

- Reading of the strip code
- Measurement of the reference
- Measurement of the values

2nd Stage Under a K40 filter

- Measurement of the reference
- Measurement of the values

3rd Stage Under a Dt Blue filter

- Measurement of the reference
- Measurement of the values

4th Stage Under a Dt Green filter

- Measurement of the reference
- Measurement of the values

5th Stage Calculation of the numerical values (see Figure 4-2).

Nephelometric Reading

For each cupule of the strip ***mini API*** performs two types of measurements:

- Turbidimetry: measurement of the intensity of transmitted light (T) which is inversely proportional to the amount of bacterial growth.
- Nephelometry: measurement of the intensity of light scattered (S) at 30°, directly proportional to the amount of bacterial growth.

The reader transmits these two values which enable the estimation of the density of bacterial growth in the medium (turbi-nephelometry) according to the following ratio:

Turbi-nephelometry = S / T x 256.

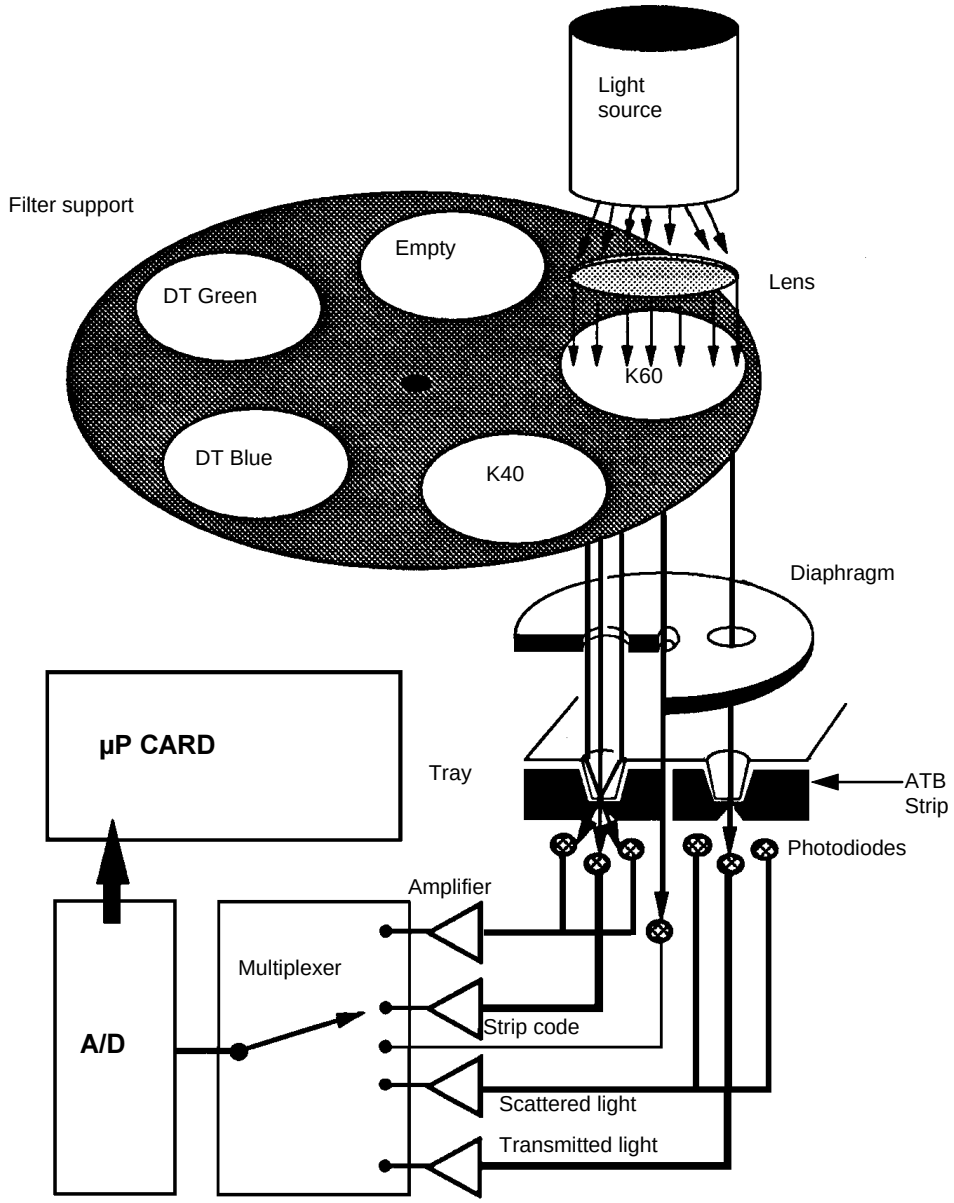


Figure 4-4 Reading Principle

Block Diagram of Analogue-Digital Converter

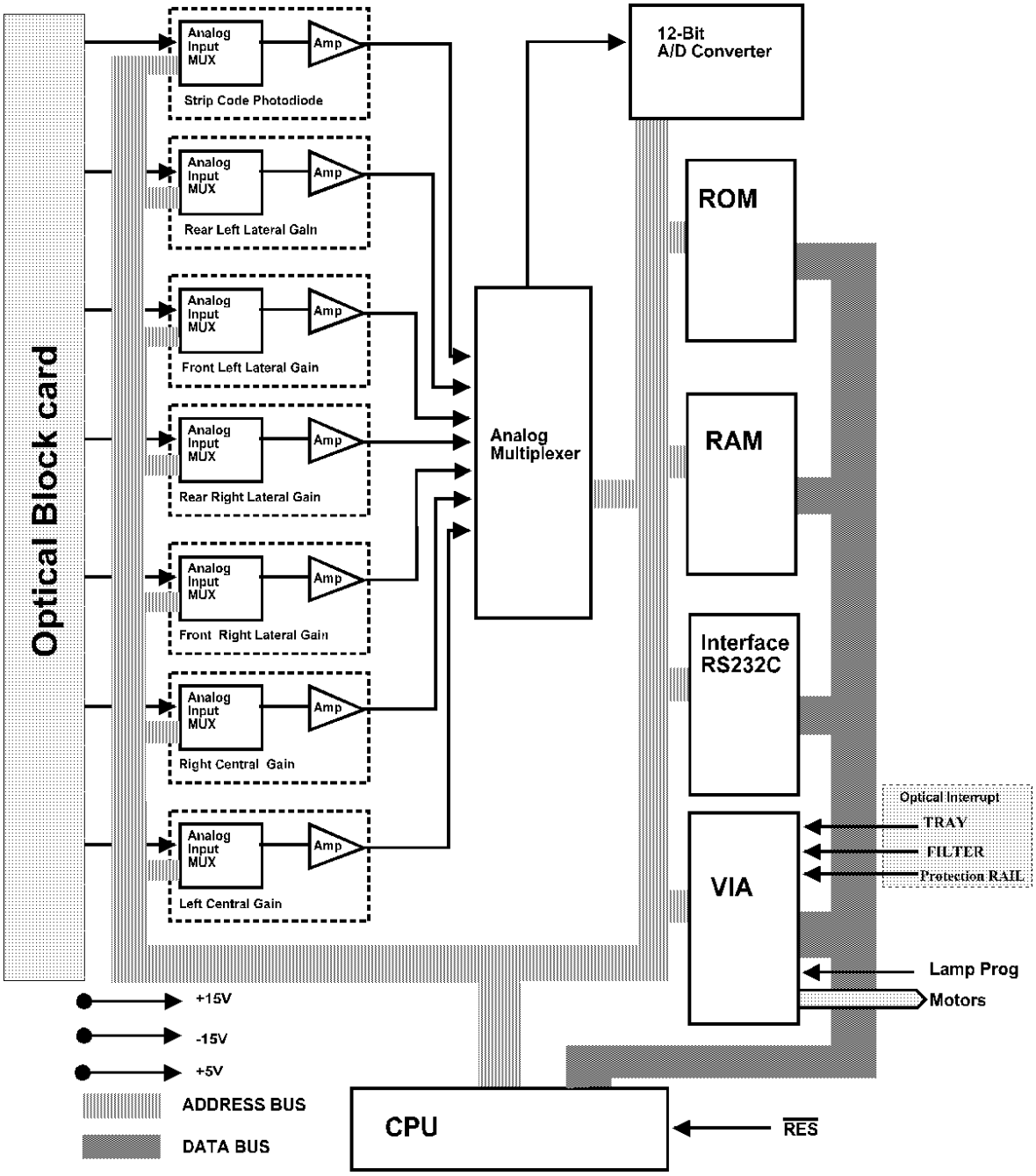


Figure 4-5 Analogue-Digital Converter

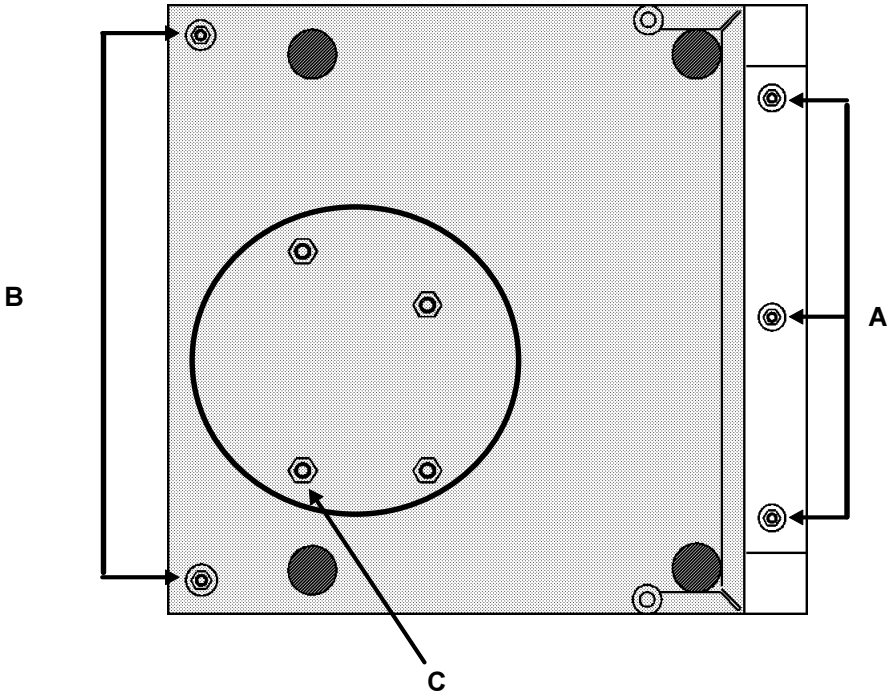


Figure 4-6 Position of Casting Screws

Before any of the following procedures can be performed, ***mini API*** must be partially disassembled.

To reach the proper stage of disassembly, proceed as follows:

REMOVING THE CASING (CASING ASSY) = 452 1040A

- Pull out the protection rail.
- Remove the tray.
- Remove the three M5x10 CHC screws from the back panel of the instrument (A).
- Remove the two M5x10 CHC screws from the front of the instrument (B).
- Place your hands flat on either side of the instrument and lift off the casing.

WARNING ! Do not place your fingers underneath the instrument to lift off the casing.

SECTION 4.3 POWER SUPPLY BLOCK

SECTION CONTENTS

This section includes:

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BOARD POWER (450 0628A)	4-30
• Location	4-30
• Removing the Board Power	4-30
PRINCIPLE OF OPERATION (POWER SUPPLY BLOCK)	4-32
• Power Supply Circuit Operation	4-32
• Reader Power Supply	4-32
• Computer Power Supply	4-32
PRINCIPLE OF OPERATION (BOARD POWER)	4-33
• Filter Motor Drive Circuit	4-33
• Tray Motor Drive Circuit	4-34
TESTING AND ADJUSTMENT	4-35
• Reader Power Supply	4-35
• Board Power	4-36
• Procedure	4-37

CABLE CONNECTIONS

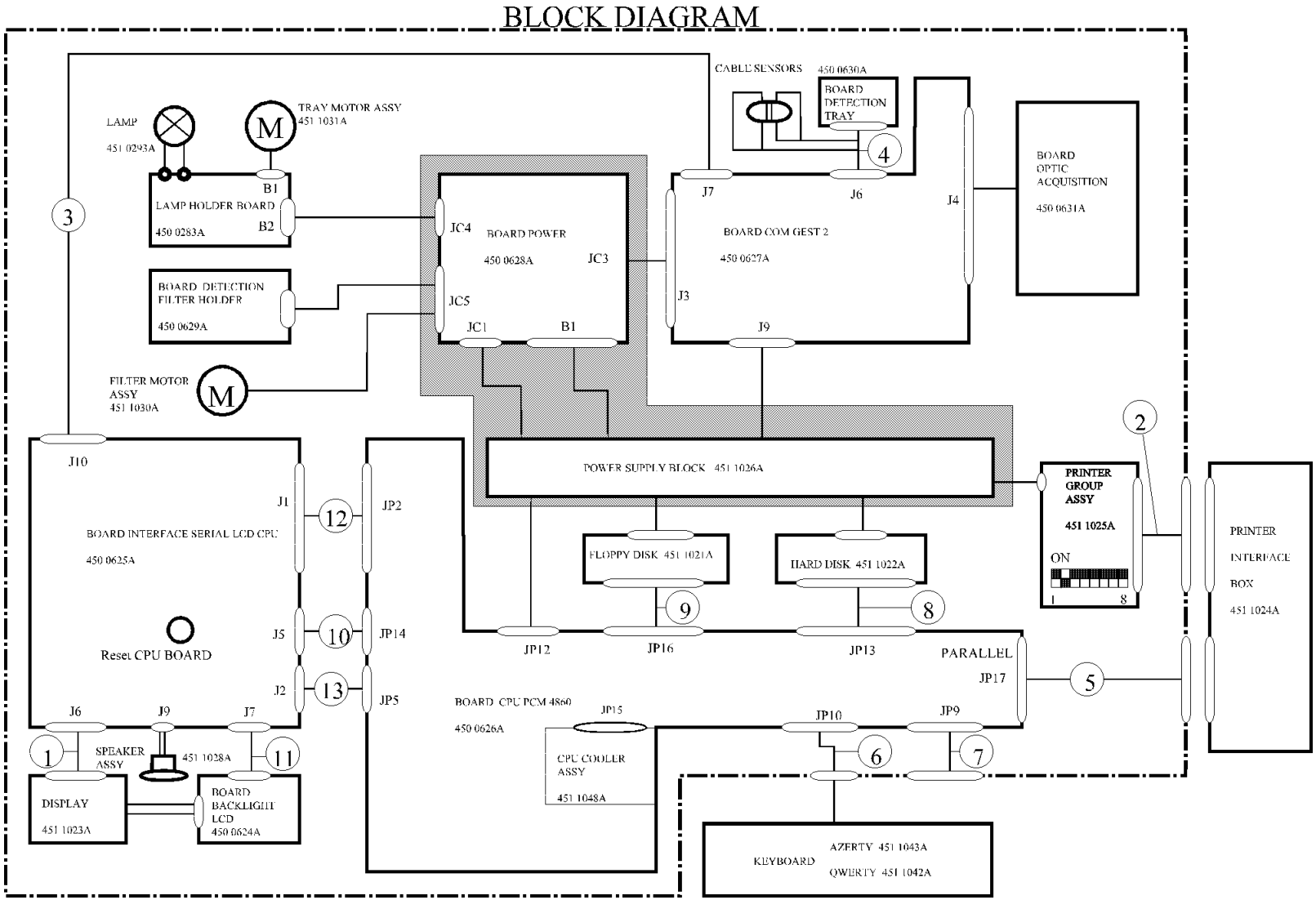

Figure 4-7 Power Supply Cable Connections

EQUIPMENT

Designation	Part Number
Board Power	4500628 A
Power Supply Block	4511026 A

REMOVING THE POWER SUPPLY BLOCK (451 1026A)

- Remove the casing (see page 4-21).
- Remove the printer (see page 4-119).
- Remove the three M4x8 CHC screws from the back of the instrument and take off the back panel.
- Disconnect the power supply cable on the hard disk and the floppy disk.
- Disconnect the cables from connectors J3 and J9 on the board COM GEST2.
- Disconnect the cables from connectors JC4 and JC5 on the board power.
- Remove the four M4x8 CHC screws located on the right and left-hand sides of the power supply block.
- Remove the power supply block.

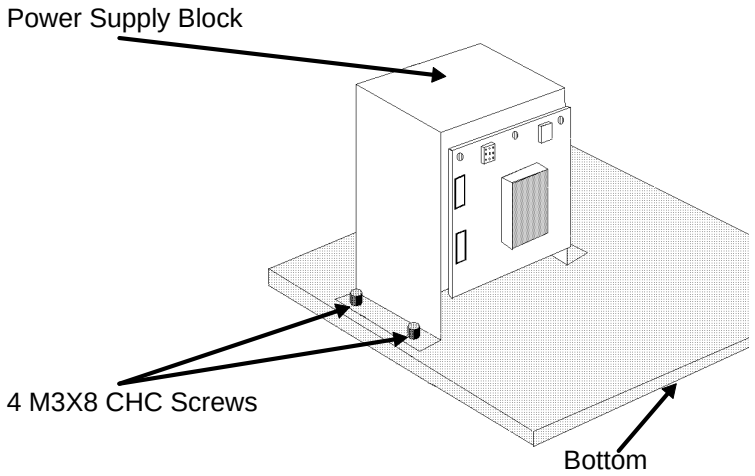

Figure 4-8 Removing the Power Supply Block

BOARD POWER (450 0628A)

Location

This board is fastened to the front part of the power supply block.

Removing the Board Power

- It is not necessary to remove the power supply block in order to remove the board power.
- Remove the casing (see page 4-21).
- Remove the printer (see page 4-119).
- Disconnect the cables from connectors JC1, B1, JC4 and JC5 on the board power.
- Disconnect the cables from connector J3 on the COM GEST2 board.
- Remove the three M3x6 CHC screws on the board power.
- Remove the board power.

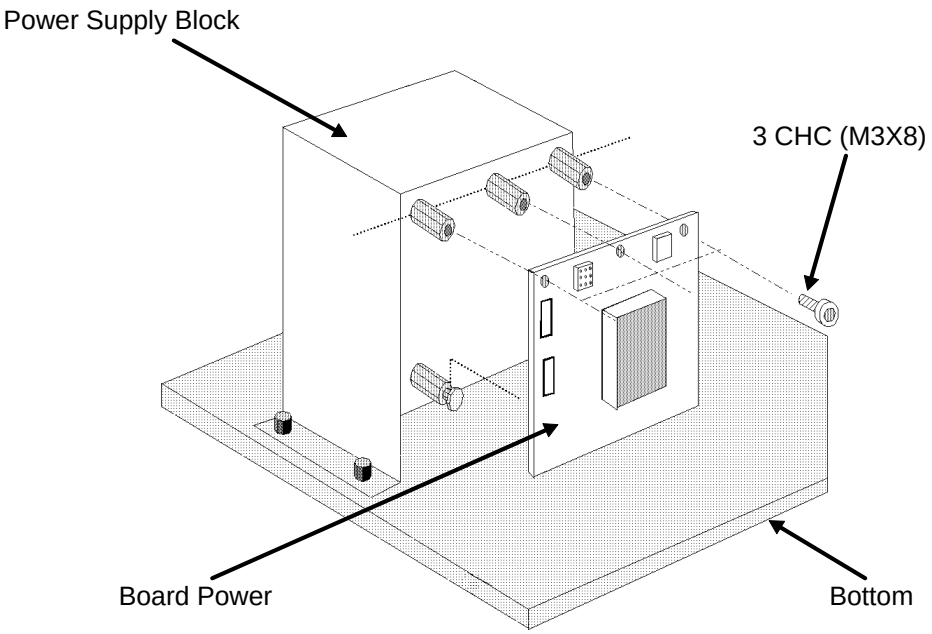

Figure 4-9 Removing the Board Power

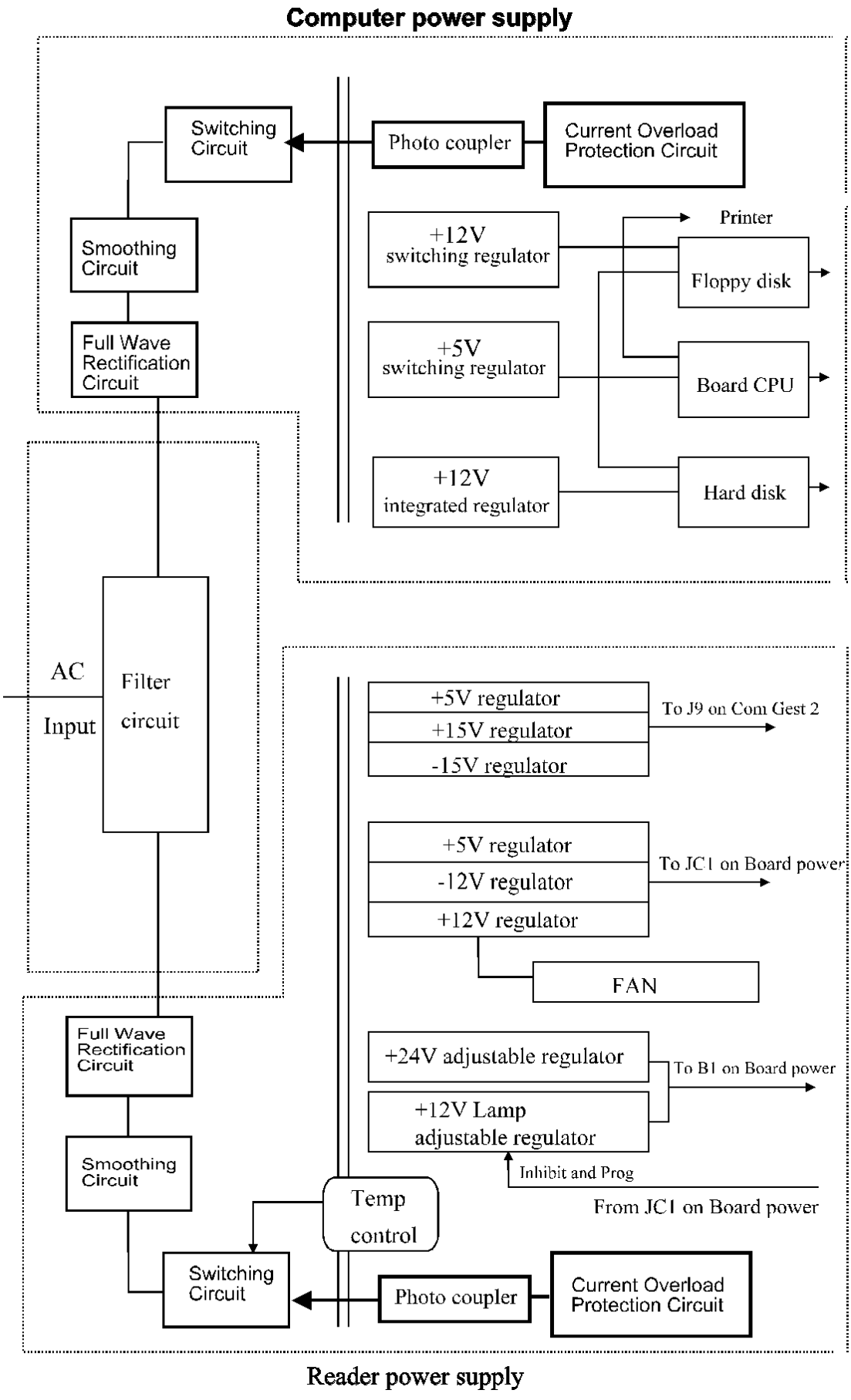

Figure 4-10 Power Supply Circuit Block Diagram

PRINCIPLE OF OPERATION (POWER SUPPLY BLOCK)

Power Supply Circuit Operation

Figure 4-10 shows the power supply circuitry in the form of a block diagram.

When AC power enters ***mini API*** from an external power source, the filter circuit removes the noise.

Reader Power Supply

It provides the board COM GEST2 with stabilised +5VDC and +/- 15VDC from the 220V mains.

It provides the board power with stabilised +5VDC and +/- 12VDC.

The AC voltage then undergoes full wave rectification and is smoothed to produce direct current.

A voltage detector circuit is connected to the switching circuit. This feedback control arrangement ensures a stable voltage supply.

An automatic electronic current-limiting circuit with automatic recovery limits short-circuit output current to a safe preset value, protecting load and power supply when direct shorts occur.

It provides the board power with +24VDC to supply motors and +12VDC to supply the lamp.

Computer Power Supply

It provides the board CPU, hard disk and floppy disk with stabilised +5VDC and +12VDC.

It provides the printer with +12VDC.

An automatic electronic current-limiting circuit with automatic recovery limits short-circuit output current to a safe preset value, protecting load and power supply when direct shorts occur.

PRINCIPLE OF OPERATION (BOARD POWER)

The board power has two main functions:

Filter Motor Drive Circuit

The filter motor, which is a bipolar stepper motor, is used to change the filter during a colorimetric reading. It advances 3.6° per step.

COM GEST2 U13 circuit ports (PB2, PB4, PB7) are used to control the filter motor.

The filter motor drive circuit (GS D200S) is a complete controller and driver that incorporates all the power functions to directly interface a microprocessor and a two-phase permanent magnet motor.

Very little information is sent by the microprocessor to the module.

- Step Clock.
- Direction (Clockwise or counterclockwise CC/CCW).
- Reset and Enable.

Based on this information, the module generates the proper four-phase sequence to directly drive a two-phase bipolar motor.

The GS D200S incorporates a thermal protection that switches off the power stages when the junction temperature of active components reaches 150°C.

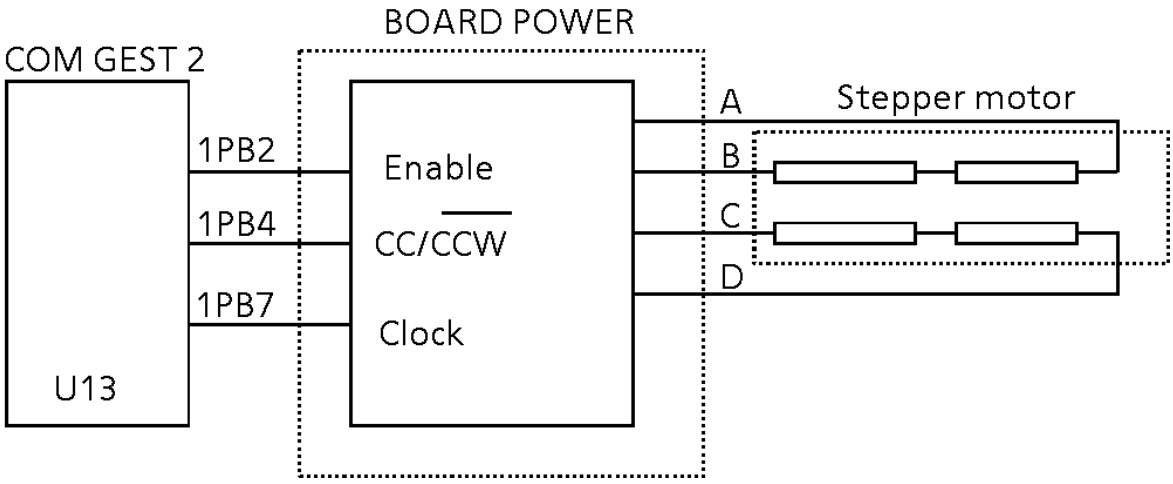

Figure 4-11 Filter Motor Drive circuit

Tray Motor Drive Circuit

The tray motor (continuous motor) is used to move the tray in two directions.

The P2 potentiometer allows you to adjust the output voltage to drive the motor and thus adjust the speed of the tray.

COM GEST2 U13 circuit ports (PB3, PB5, PB1) are used to control the tray motor.

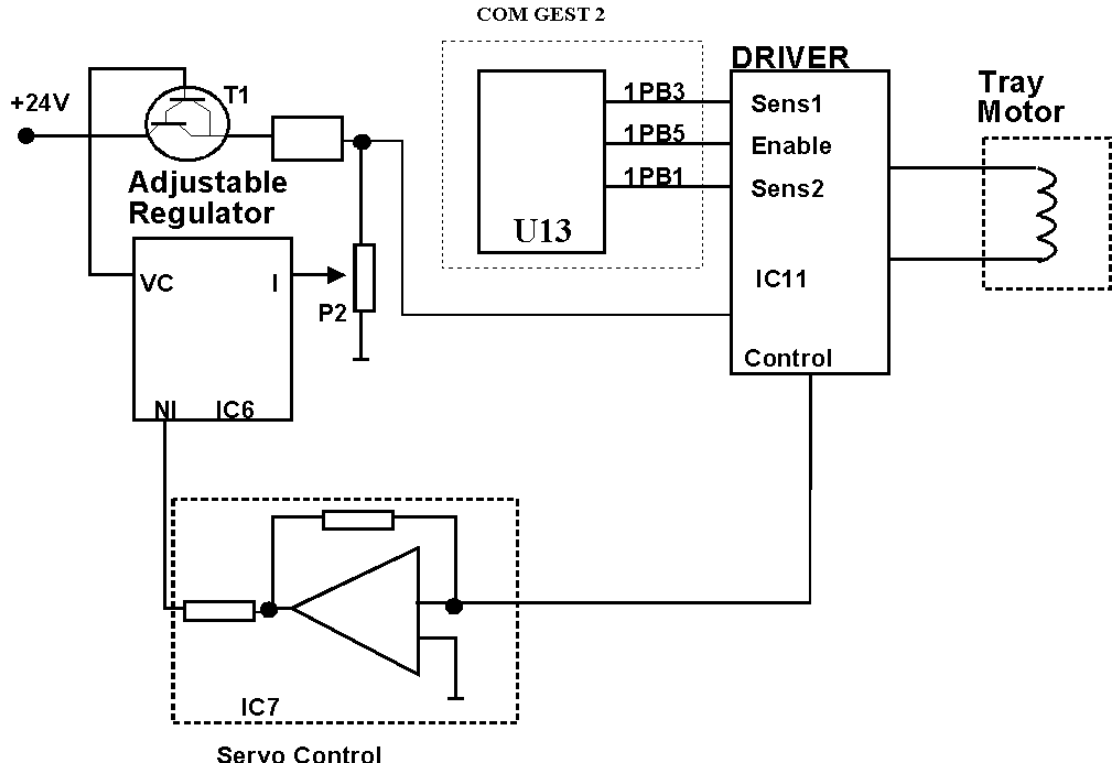

Figure 4-12 Tray Motor Drive circuit

TESTING AND ADJUSTMENT

Material required:

- Digital multimeter (Fluke 8050A or equivalent).
- Screwdriver for adjustment.
- ***mini API*** maintenance software included in the colorimetric kit (product no. 455 0128A).

Reader Power Supply

Adjustment procedure:

+24VDC Adjustment

- Connect DMM between PT6 (Gnd) and PT1 (24V) on the board power.
- Adjust with the RV1 potentiometer on the power supply block (see Fig. 4-13) so that the voltage is between 24VDC +/- 0.1V.

Output Voltage Range			Terminals	
+5V	+/-1%	(Non-Adj)	+5V	1.5A
+15V	+/-1%	(Non-Adj)	+15V	0.3A
-15V	+/-1%	(Non-Adj)	-15V	0.3A
+24V	+/-0.1V	(Adj)	+24V	1.5A
+/-12V	+/-2%	(Non-Adj)	+/-12V	2.2A

+12VDC Lamp Adjustment

To adjust the lamp, use the maintenance software (see Chapter 10).

- Adjust RV2 on the power supply block to obtain 11.5V +/- 0.1V.

CAUTION ! Take measurements directly from the lamp pins on the lamp holder board.

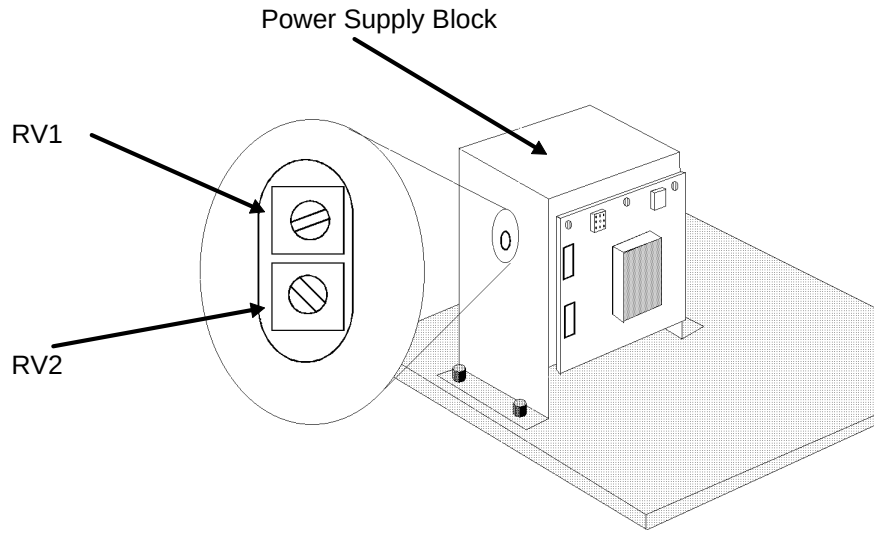

Figure 4-13 Switching Power Supply Card Testing and Adjustement

Board Power

PT3 allows you to control the supply voltage of the tray motor (continuous motor) which is adjusted using P2 on the board power.

PT3 is not used during the voltage adjustment.

The FU1 fuse protects the +24V on the GS D200S chip against overloading.

– 1A Slow blow fuse .

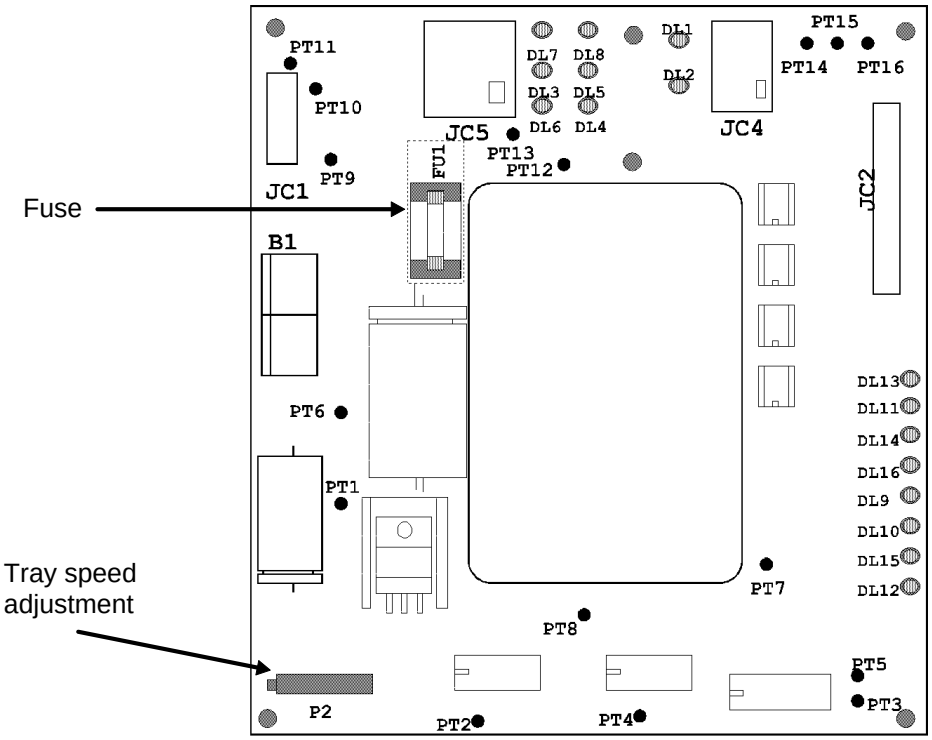

Figure 4-14 Board Power

Procedure

After initialisation of the system and the ***mini API*** maintenance software (see Chapter 10), follow the instructions below.

On the board COM GEST2:

- Ground of the oscilloscope to PT17.
- Channel A of the oscilloscope to PT33
  setup of oscilloscope 2V/div 100ms/div.

– Start a reading using **F10** and **Colorimetric reading** of the ***mini API*** maintenance software.

– Adjust P2 in order to obtain about 200 ms between the gaps of the tray.

– Repeat the operation until you obtain the correct value.

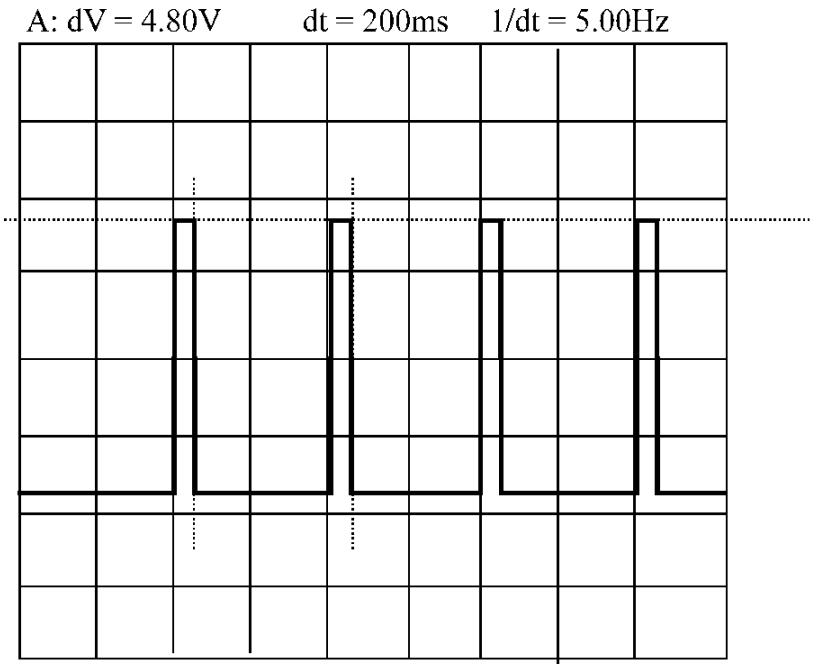

Figure 4-15 Direction of the Tray DT = 200ms (tray speed)

SECTION 4.4 OPTICAL BLOCK

SECTION CONTENTS

This section includes:

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CABLE CONNECTIONS

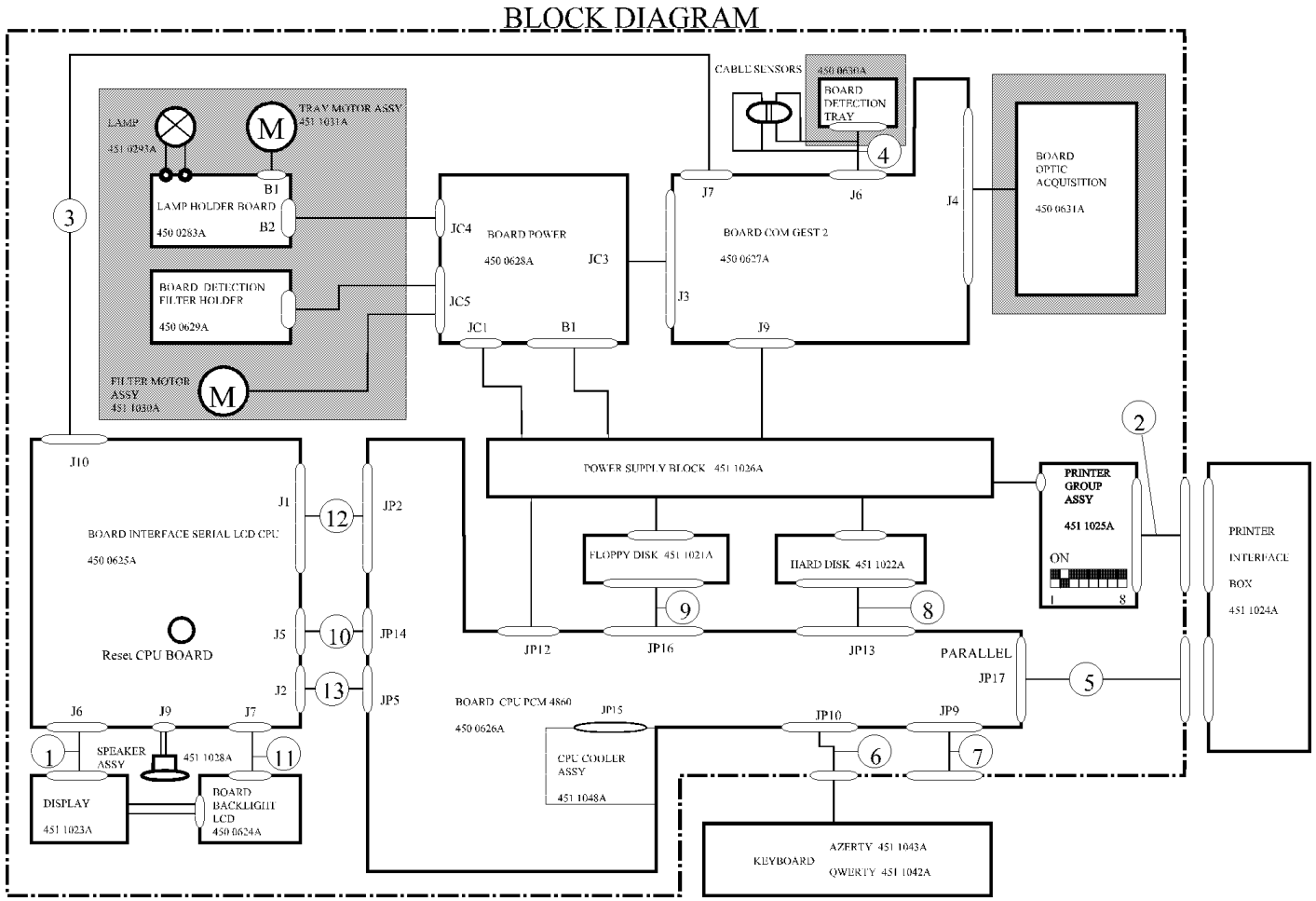


Figure 4-16 Optical Block Cable Connections

EQUIPMENT

Designation	Part Number
Condenser	452 0409A
Colorimetric Tray	452 0406A
Tray Motor ASSY	451 1031A
Filter Motor ASSY	451 1030A
Board Detection Tray	450 0630A
Lamp Holder Board	450 0283A
12V 20W Tungsten Lamp	451 0293A
Board Detection Filter Holder	450 0629A
Board Optic Acquisition	450 0631A
Anticaloric Filter	452 0361A
DT Blue Filter	452 0365A
DT Green Filter	452 0364A
K60 Filter	452 0363A
K40 Filter	452 0362A

REMOVING THE OPTICAL BLOCK

- Remove the tray.
- Remove the casing (see page 4-21).
- Remove the printer (see page 4-119).
- Remove the earth wire on the tray motor assy (A).
- Remove the earth wire on the board optic acquisition from the bottom of the instrument (B).
- Disconnect the cables from connectors JC4 and JC5 on the board power.
- Disconnect the cable from connector JC1 on the board detection tray.
- Disconnect the cable from connector JC4 on the board COM GEST2.
- Remove the four HM5 nuts (C) from the bottom of the ***mini API*** (see page 4-20).
- Remove the optical block.

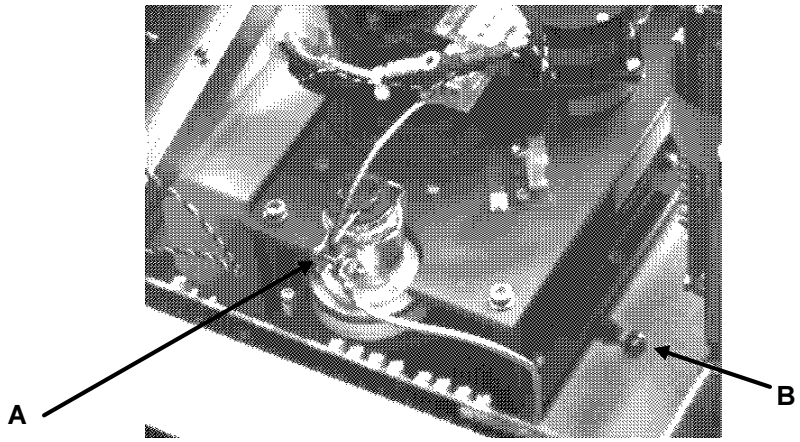


Figure 4-17 Removing the Optical Block

CONDENSER (P/N 452 0409A)

Removing the Condenser

- Remove the casing (see page 4-21).
- Remove the printer (see page 4-119).
- Remove the optical block (see page 4-42).
- Remove the two CHC (M3X8) screws on the protection plate (A).
- Remove the protection plate.
- Disconnect the cable from connector B1 on the lamp holder board.
- Remove the two CHC (M3X8) screws on the condenser (B).
- Remove the condenser by pulling it away from the optical block.

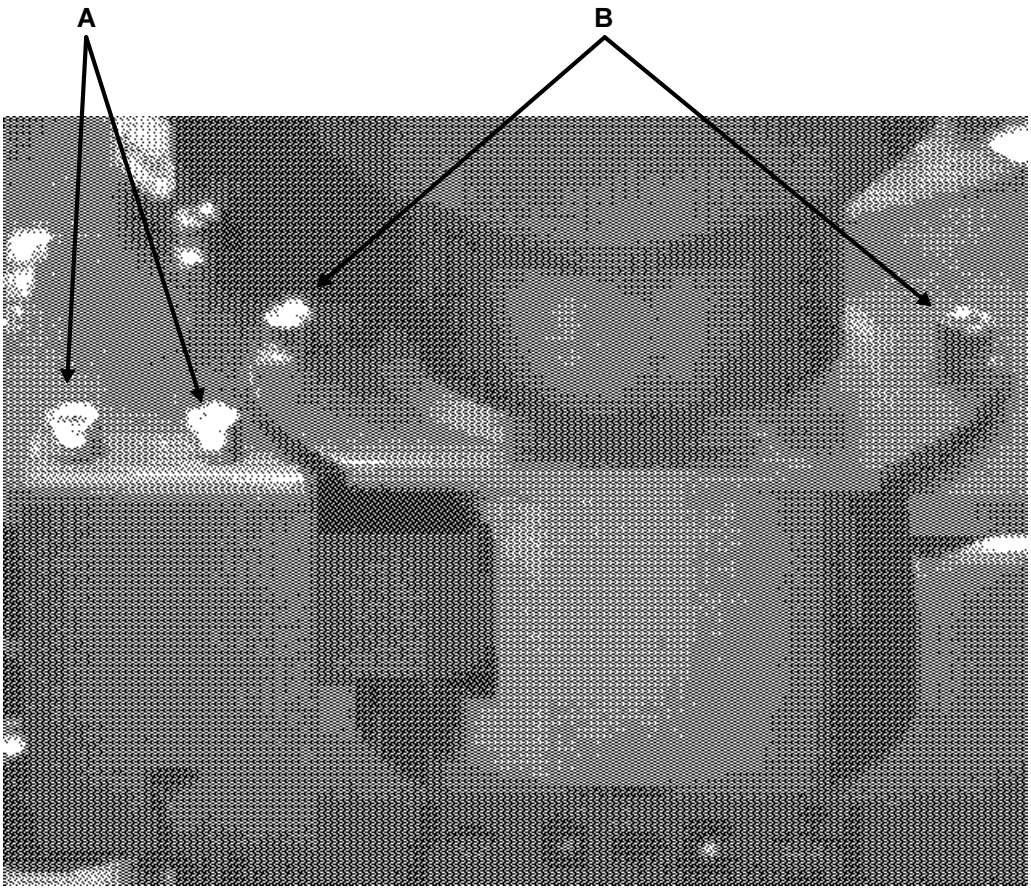


Figure 4-18 Removing the Condenser

LAMP (P/N 451 0293A)

Removing the Lamp

- Remove the casing (see page 4-21).
- Remove the printer (see page 4-119).
- Remove the two CHC (M4X10) screws on the lamp holder board.
- Remove the lamp holder board.
- Untighten the CHC (M3X6) screws on the square lamp support.
- Untighten the CHC (M2X10) screws on the block fixing the lamp.
- Remove the lamp.

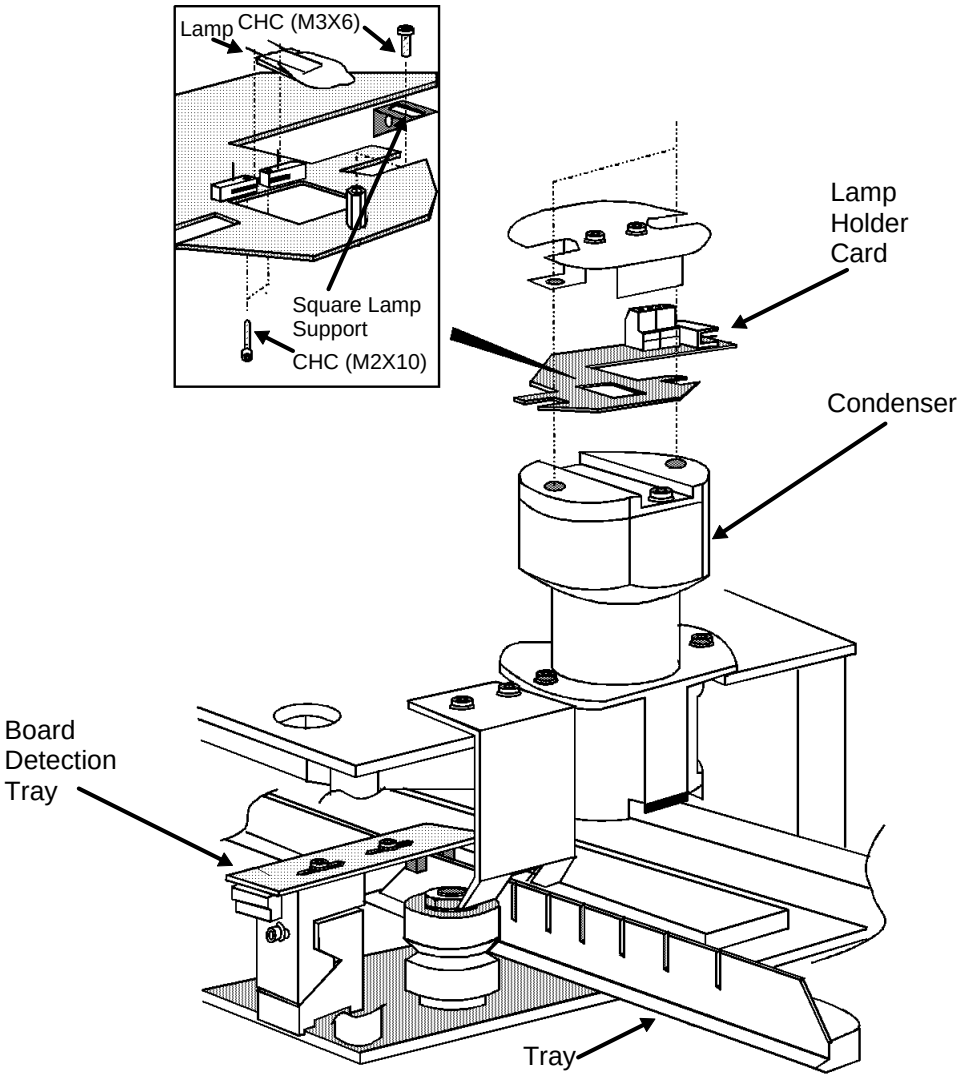


Figure 4-19 Removing the Lamp

Removing the Lamp (cont'd)

CAUTION ! ***The lamp must be handled with care. Do not touch it directly with your fingers.***

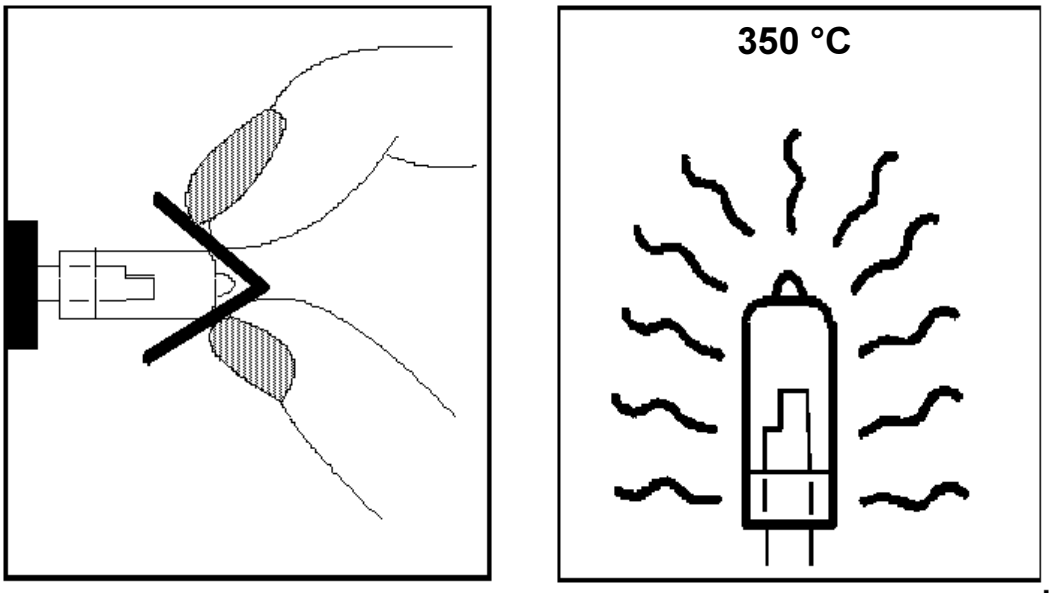


Figure 4-20 Handling the Lamp

BOARD OPTIC ACQUISITION (P/N 450 0631A)

Location

The board is fastened underneath the optical block.

Removing the Board Optic Acquisition

- Remove the casing (see page 4-21).
- Remove the optical block (see page 4-42).
- Remove the three CHC (M3X6) screws underneath the optical block (A).
- Remove the board.

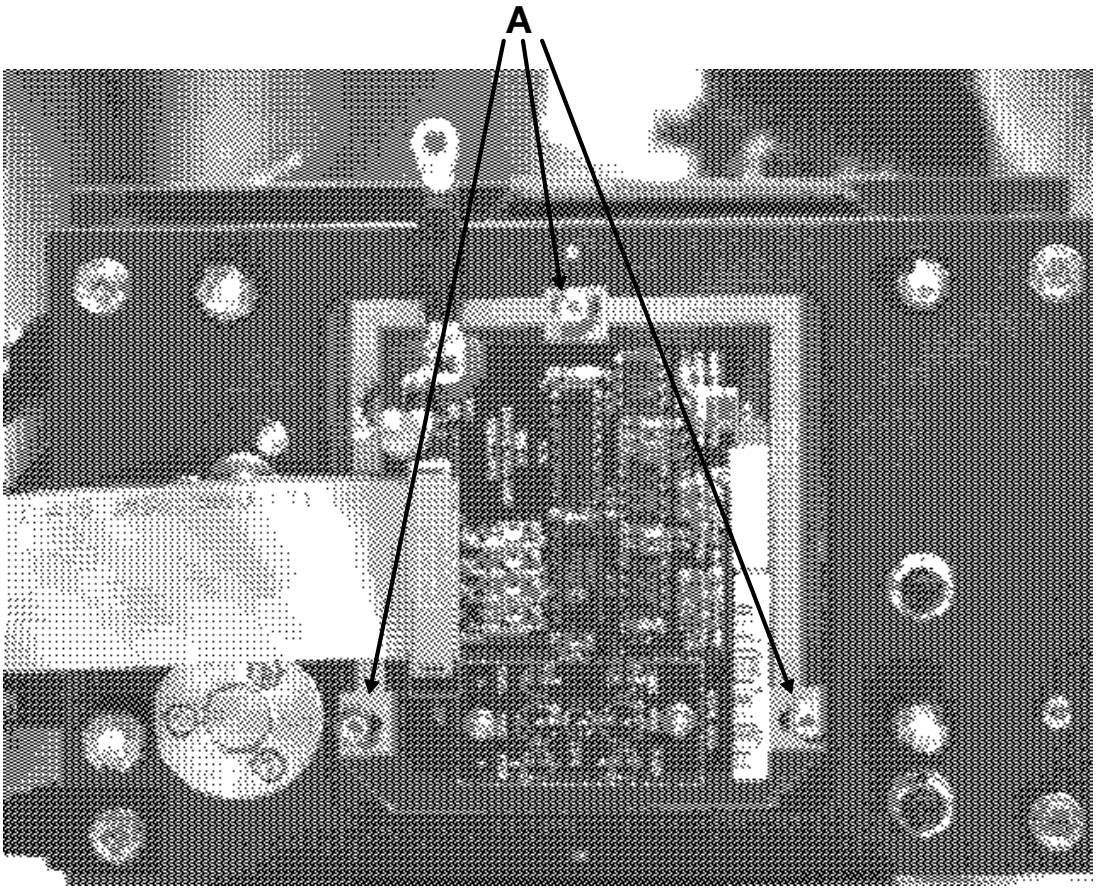


Figure 4-21 Removing the Board Optic Acquisition

BOARD DETECTION TRAY (P/N 450 0630A)

Location

The board is fastened on the left-hand side of the lower plate of the optical block.

Removing the Board Detection Tray

- Remove the casing (see page 4-21).
- Remove the cable from the JC1 connector on the board (1).
- Remove the CHC (M3X20) screw on the board detection tray support (A).
- Remove the 2 CHC (M3x6) screws to separate the support from the board (B).

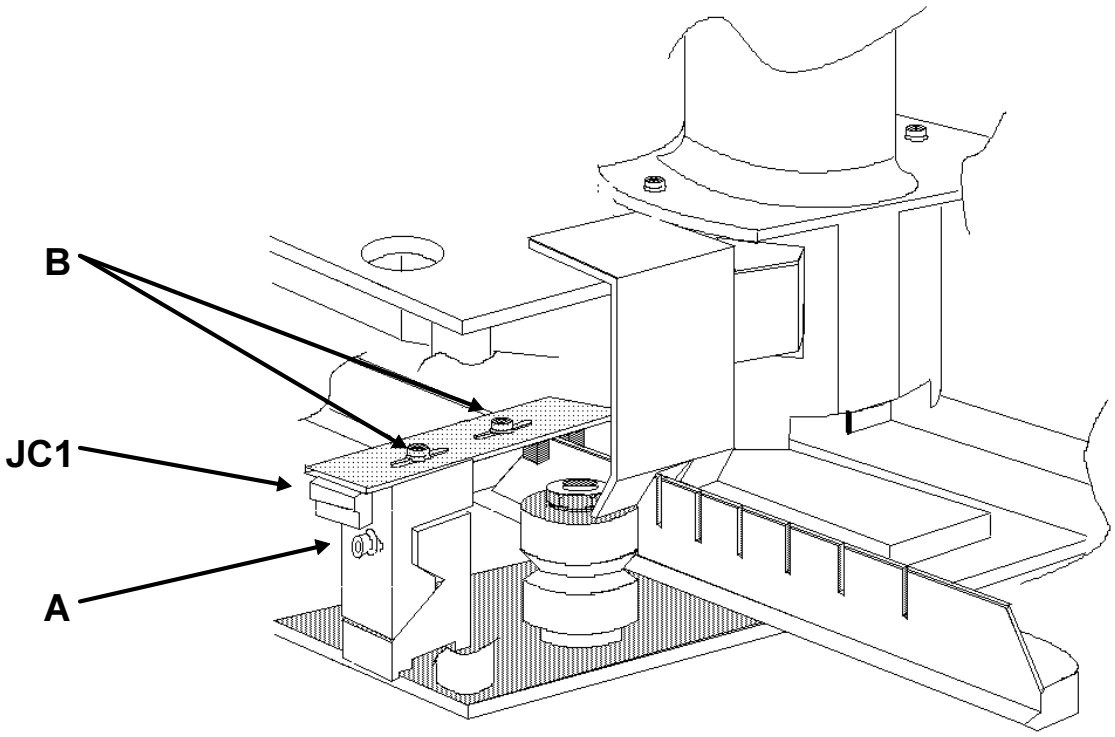


Figure 4-22 Removing the Board Detection Tray

BOARD DETECTION FILTER HOLDER (P/N 450 0629A)

Location

The board detection filter holder is fastened on the upper plate of the optical block.

Removing the Board

- Remove the casing (see page 4-21).
- Remove the cable from the JC1 connector on the board.
- Remove the 2CHC (M3X6) screws on the board (A).
- Remove the board.

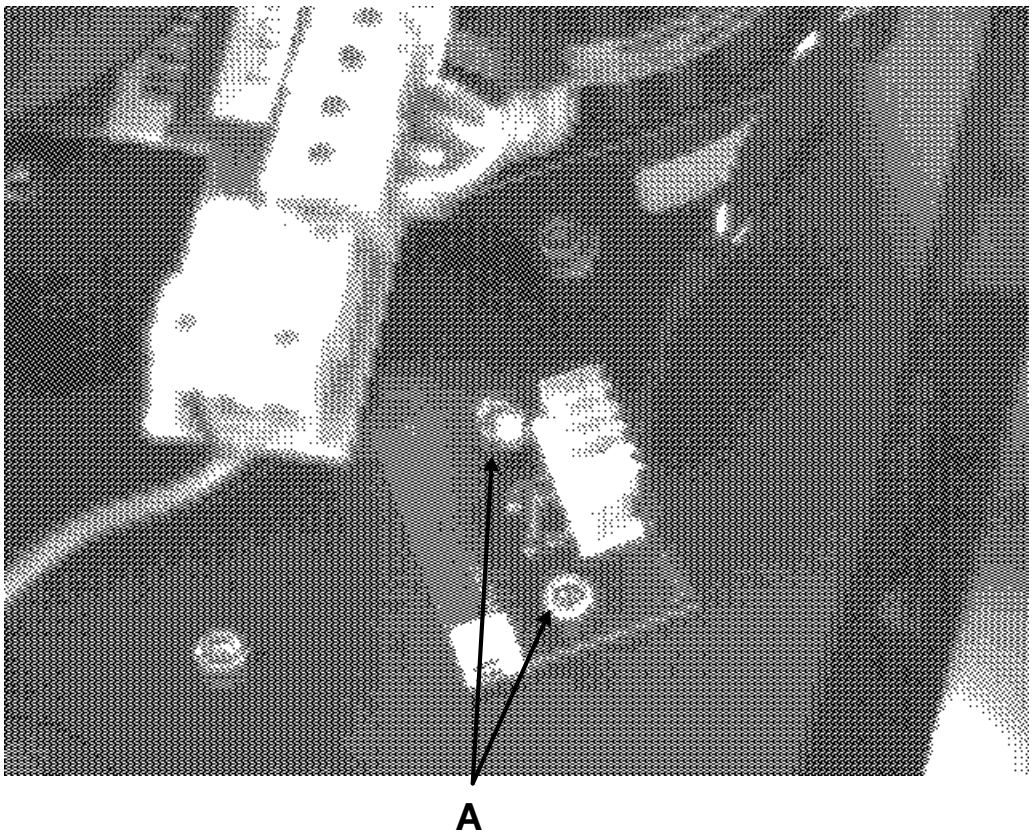


Figure 4-23 Removing the Board Detection Filter Holder

PRINCIPLE OF OPERATION

Lamp States

The ports (1PA7, 1PB0) on the board COM GEST2 (U13) circuit are used to control the voltage lamp.

The Zener diode allows you to maintain a voltage of 2V during standby.

The Tungsten lamp provides the light source during reading of the strip. It has three states controlled by the firmware.

Lamp switched off:	-	When switching on, before initialisation.
	-	After 5 mins on standby.
Lamp on standby:	-	After the reading, the lamp remains on standby for 5 minutes. If there are no other readings, it switches off.
Lamp switched on:	-	During a reading.
	-	When starting a reading, if the lamp has been switched off it needs 5 seconds to reach the operating temperature. These 5 seconds are not necessary if the lamp has been on standby.

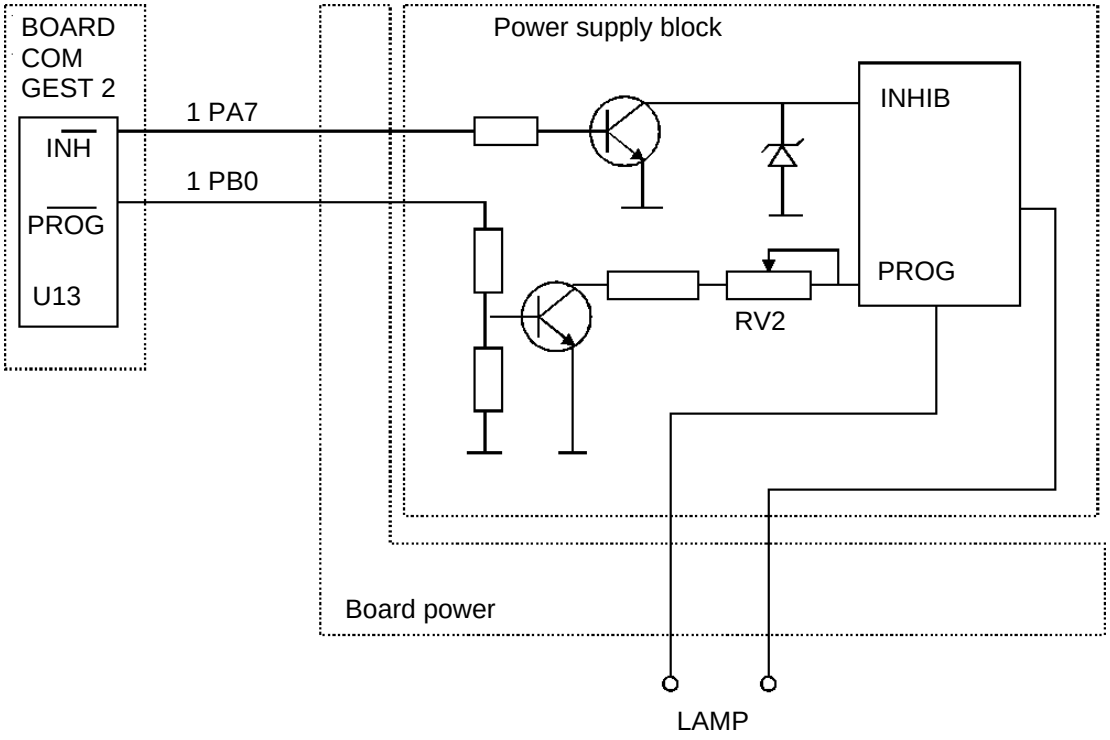


Figure 4-24 Lamp Control Drive Circuit

Board Optic Acquisition

The board optic acquisition is centred under the condenser.

Via photodiodes, the light transmitted and scattered through the cupules is transformed into an electrical measurement which is transmitted to the board COM GEST2.

Reading of the strip code and colorimetric reading are performed with the normal gain (switch OFF).

Nephelometric reading is performed with a quarter of the gain of the colorimetric mode.

The CA2 signal is UP, the switch is ON and the amplifier gain is divided by 4.

Analogical switching only occurs with the central photodiodes and the strip code diode.

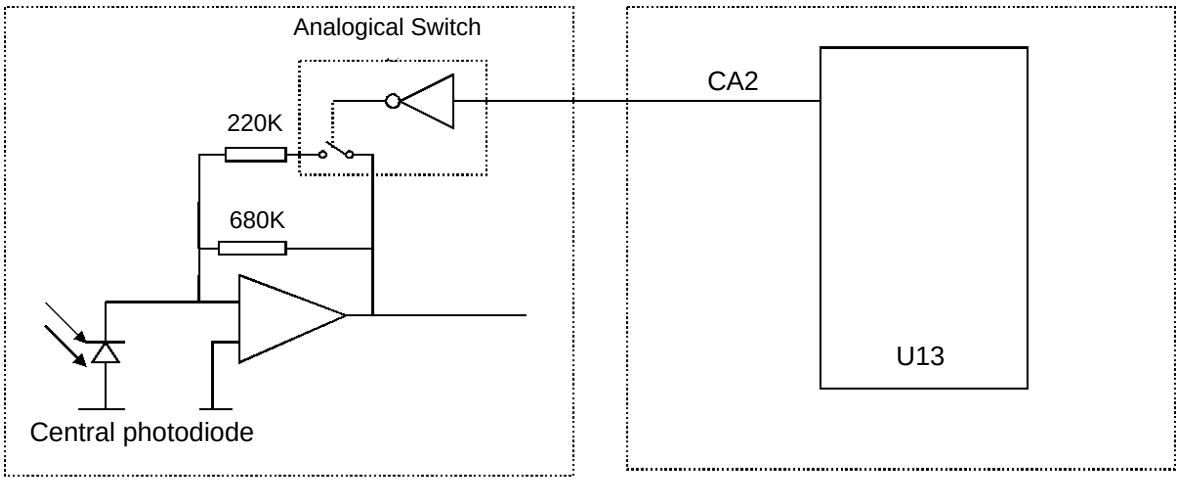


Figure 4-25 Analogical Switching

Board Detection Tray

This board enables the detection of the gaps of the tray's setting stick. The electrical information collected on this board goes to the board COM GEST2.

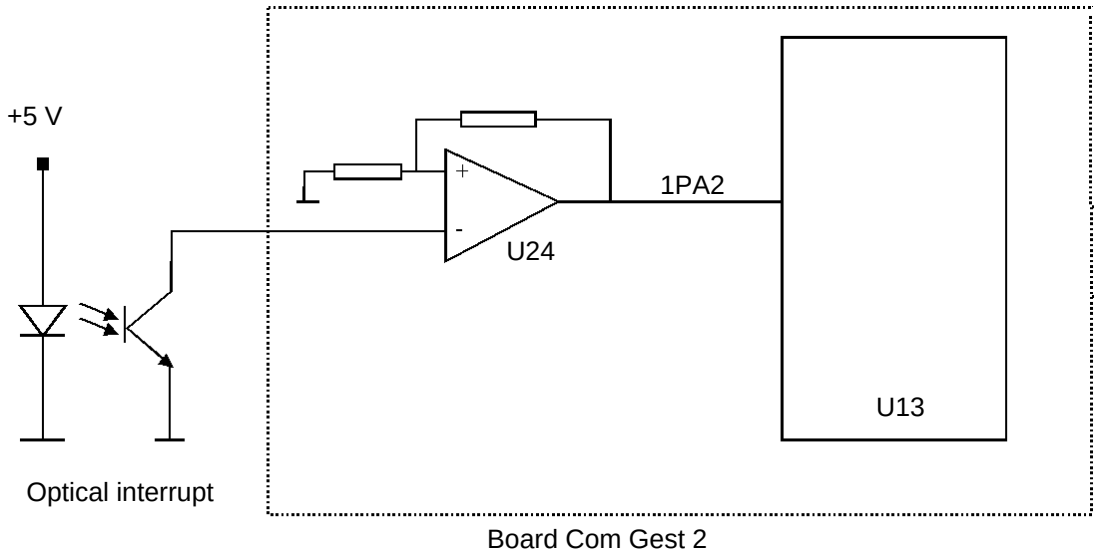


Figure 4-26 Board Detection Tray Circuit

Board Detection Filter Holder

This board enables the detection of the pin placed on the filter holder cylinder. The information picked up by the detector goes to the board COM GEST 2 via the board power.

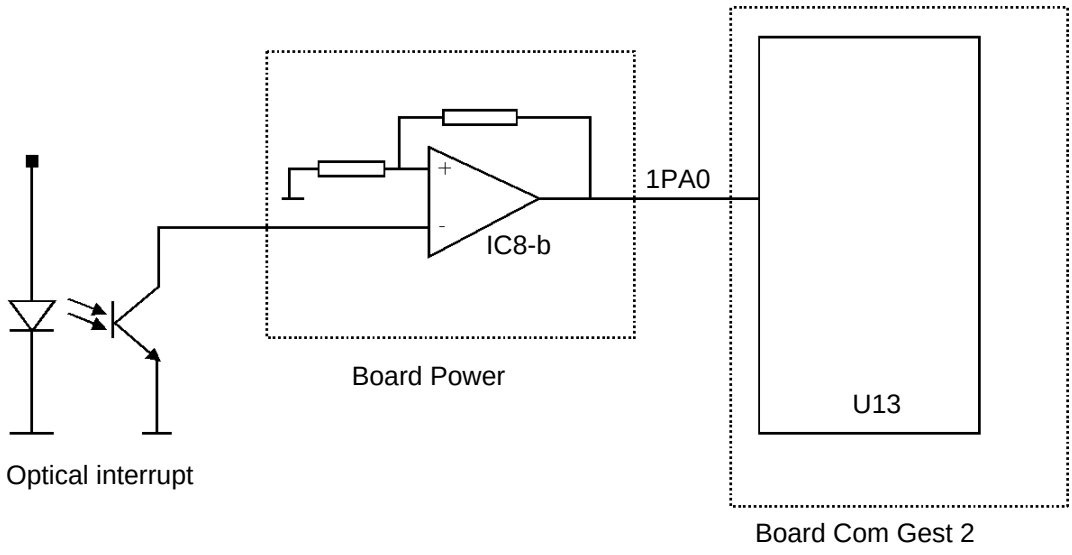


Figure 4-27 Board Detection Filter Holder Circuit

TESTING AND ALIGNMENT

Material required:

- Digital multimeter (Fluke 8050A or equivalent)*.
- Screwdriver for adjustment.
- Maintenance software.

*Equipment must bear a valid calibration sticker.

CAUTION ! ***The power supply must be adjusted before you perform the condenser alignment.***

If you make any modifications to the condenser alignment, you are obliged to carry out nephelometric adjustments.

Lamp and Condenser

NOTE : Perform the procedure below only if necessary (bad alignment between the lamp, the diaphragm and the board optic acquisition).

Adjustment Procedure:

★ After initialisation of the system and the maintenance software (see Chapter 10):

- Remove the tray.
- Light up the lamp using the maintenance software.
- Untighten the two screws fixing the diaphragm on the condenser (1).
- Adjust the position of the beams as shown in Figure 4-28 with the diaphragm (2) to obtain correct focus.

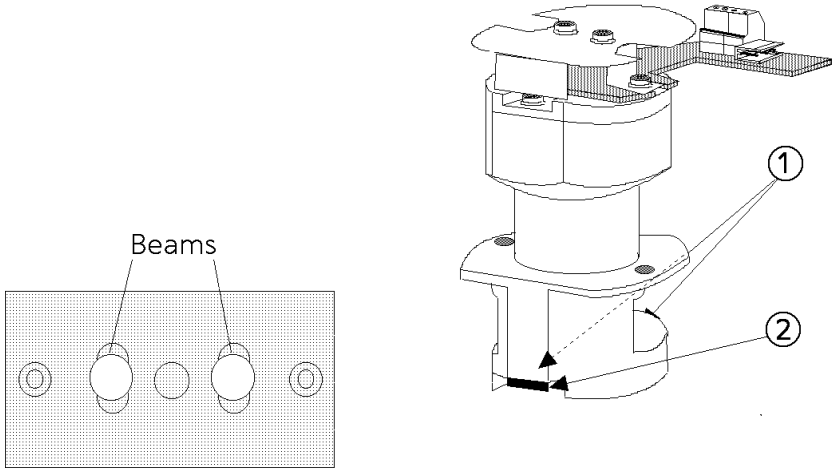


Figure 4-28 Beam Alignment

★ Adjust the lamp holder board as follows:

On the board COM GEST2:

– Ground of the oscilloscope to PT17.

– Channel 1 of the oscilloscope to PT20 (left central photodiode signal).

– Channel 2 of the oscilloscope to PT22 (right central photodiode signal).

The lamp is switched on using the **F4** function of the maintenance software.

– Perform the alignment under K60 filter using the **F3** command.

– Find the position of the untightened lamp holder board allowing you to obtain the same signal on the left and right channels.

– The signal must have maximum amplitude.

– Check the alignment under each filter using the **F3** command (equal signals).

– Block the lamp holder board by tightening the two fixing screws.

NOTE : The amplitudes of the signals are different with each filter.

★ Perform the colorimetric adjustment again using the maintenance software (see page 10-13).

– Put the tray back into position.

– Run the colorimetric adjustment menu.

– Check the reference values which should be between 130 and 200.

– Under each filter, the difference between the Min and Max values must be <10.

★ Check the strip code and initialisation signal as follows:

On the board COM GEST2:

- Ground of the oscilloscope to PT17.
- INV Channel 1 of the oscilloscope to PT2 (strip code photodiode signal).

- Place an ATB ANA strip with 2 supplementary tests on the tray.

- Start a nephelometric reading cycle.

- Using the oscilloscope, save the signal during the first entry of the tray under the K60 filter.

You should obtain the signal shown in the following diagram.

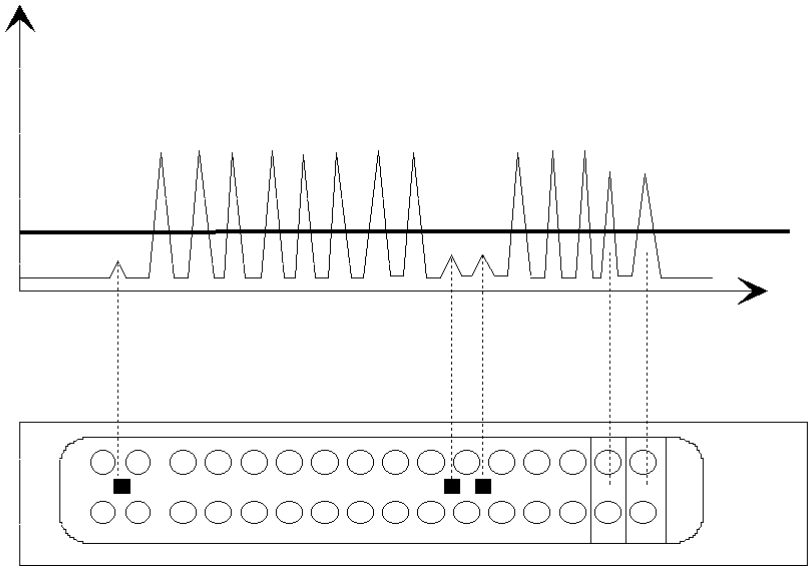


Figure 4-29 Strip Code Reading

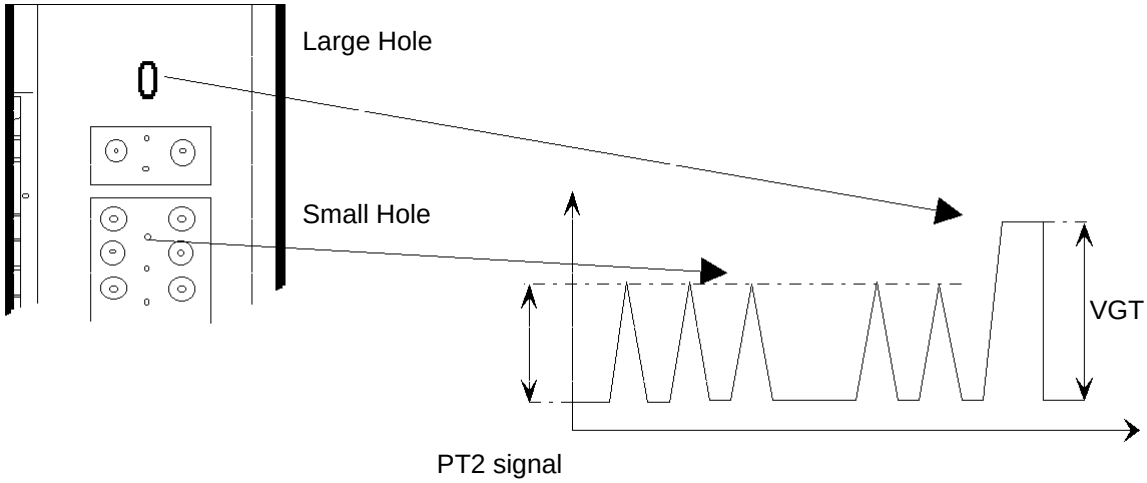


Figure 4-30 Oscillogram and Holes on the Tray

★ Check the code recognition thresholds

The large hole of the tray is used as a marker during the initialisation cycle (under W.F: without Filter) or as an end of cycle marker (Under W.F and DTg).

In fact, its diameter allows you to obtain a greater voltage amplitude with the code detection photodiode than with a small hole classically used for code detection.

When the large hole is in line with the code detection photodiode, the tray stops. It is in its home position.

The detection thresholds of the holes are fixed by the reader's firmware. They cannot be modified.

The reader is working properly when the signals measured for each hole are within the limits shown in Table C.

To obtain values within the limits, perform the alignment of the lamp and condenser.

On the board COM GEST2:

- Ground of the oscilloscope to PT17.
- INV Channel 1 of the oscilloscope to PT2 (strip code photodiode signal).

If the values exceed the limits, you should adjust the strip code attenuations under each filter (see page 10-11). In this case, use PT 36 instead of PT2.

		Large Hole		**Small Hole**	
	VPt2	**Min**	**Typical**	**Typical**	**Max**
Code	K60			3.5V5V	
Init	W.F/DTG	6.5V	8	3.5V	5V
	Threshold	5.85V		1.1V	1.4V

Table C - Limits

Board Optic Acquisition

CAUTION ! ***Changing the board involves alignment of the condenser. To perform this alignment, see the procedure on page 4-52.***

Material required:

- 2.5mm BTR spanner.
- Maintenance software.
- Oscilloscope.

Alignment Procedure:

★ After initialisation of the system and the maintenance software (see Chapter 10), follow the instructions below:

- Remove the tray.
- Untighten the three screws fixing the board optic acquisition.
- Light up the lamp using the ***mini API*** maintenance software.
- Move the board to obtain a good halo (see Figure 4-31).
- Tighten the fixing screws.
- Perform the condenser alignment again (see page 4-52).

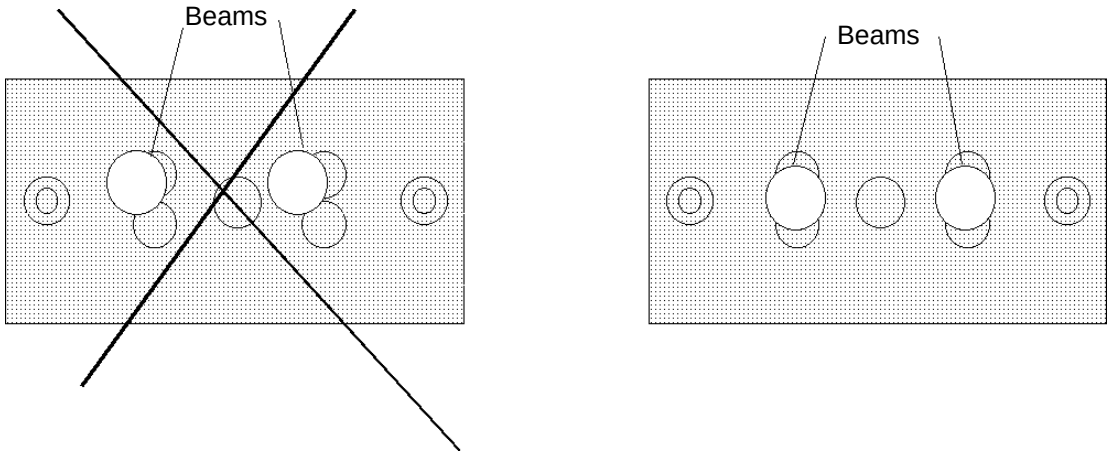


Figure 4-31 Position of the Beams

Board Detection Tray

CAUTION ! ***Before performing the board detection tray alignment, adjust the speed of the tray (page 4-36).***

Material required:

- Maintenance software.
- Oscilloscope.

Procedure:

★ After initialisation of the system and the maintenance software (see Chapter 10), follow the instructions below:

★ On the board COM GEST2:

- Ground of the oscilloscope to PT17.
- Channel A of the oscilloscope to PT33**.**
  Set-up of oscilloscope 2V/div 100 ms/div.

- Start a reading using **F10** and **Colorimetric reading** of the maintenance software (in the ATB 1525 module).

★ Check the maximum position.

- After a reading, using the **F2 Alarm** and **Maximum position** of the maintenance software, check that the average of the acquisition point values (POS column) is between 18 and 38.

Result:

Within the range

The alignment has been done.

Outside the range

A) Untighten the fixing screw on the supporting block (1).

B) Slowly move the board detection tray (2) **IN** or **OUT** according to the maximum position values (see Figure 4-32).

C) Start a reading again and check the maximum position until you obtain the right value.

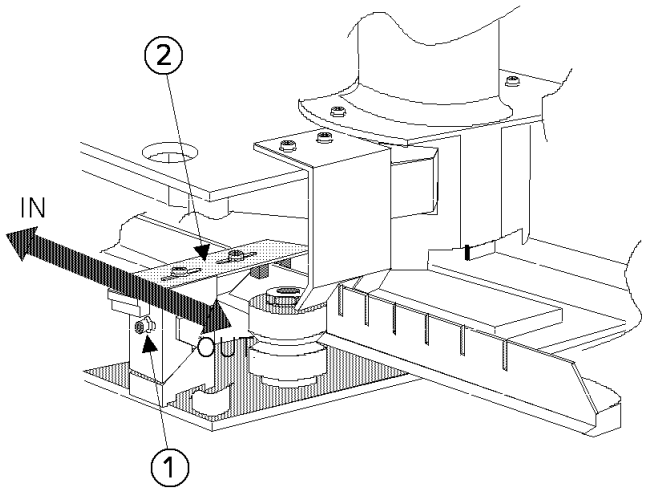


Figure 4-32 Alignement of the Board Detection Tray

SECTION 4.5 MANAGEMENT BLOCK

SECTION CONTENTS

This section includes:

	Page
CABLE CONNECTIONS	4-64
EQUIPMENT	4-65
REMOVING THE BOARD COM GEST2	4-65
PRINCIPLE OF OPERATION	4-66
• RS 232 Serial Communication	4-68
• EPROM Version Communication	4-68
• Checking the position of the Protection Rail	4-68
• Reading Mode	4-68
• Reading	4-69
• Alarm Messages	4-71
TESTING AND ALIGNMENT	4-73
• Management Card	4-73
• Compensation Adjustment	4-74
• Colorimetric Adjustment	4-74
• Nephelometric Adjustment	4-77

CABLE CONNECTIONS

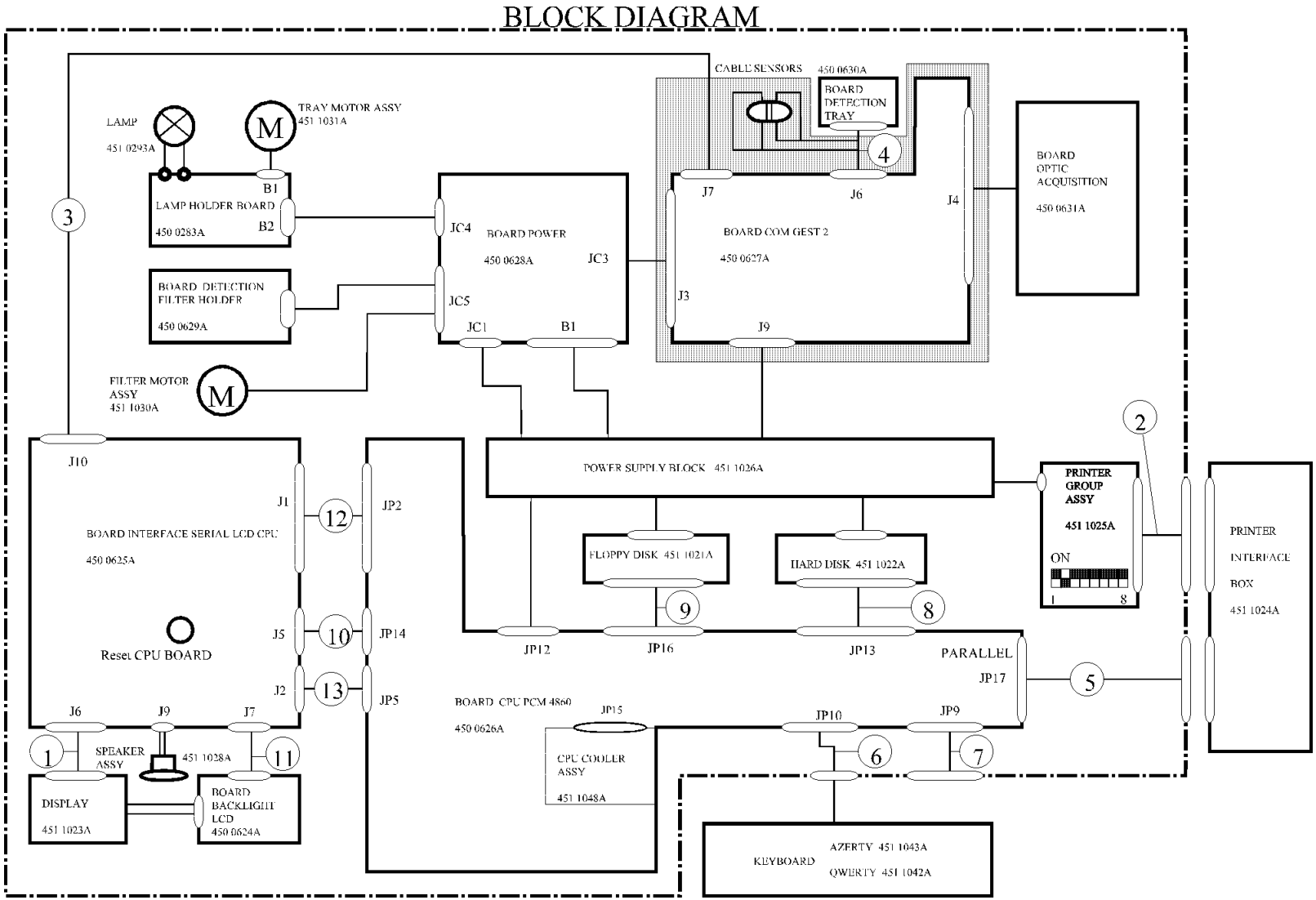


Figure 4-33 Managemnt Block Cable Connections

EQUIPMENT

Designation	Part Number
Board COM GEST2	450 0627A

REMOVING THE BOARD COM GEST2

- Remove the casing (see page 4-21).
- Remove the printer (see page 4-119).
- Disconnect the cables from connectors J3, J4, J6, J7 and J9 on the board COM GEST2.
- Remove the two CHC (M3x8) screws on the top of the board fixing the board COM GEST2 to the support (A).
- Remove the board COM GEST2.

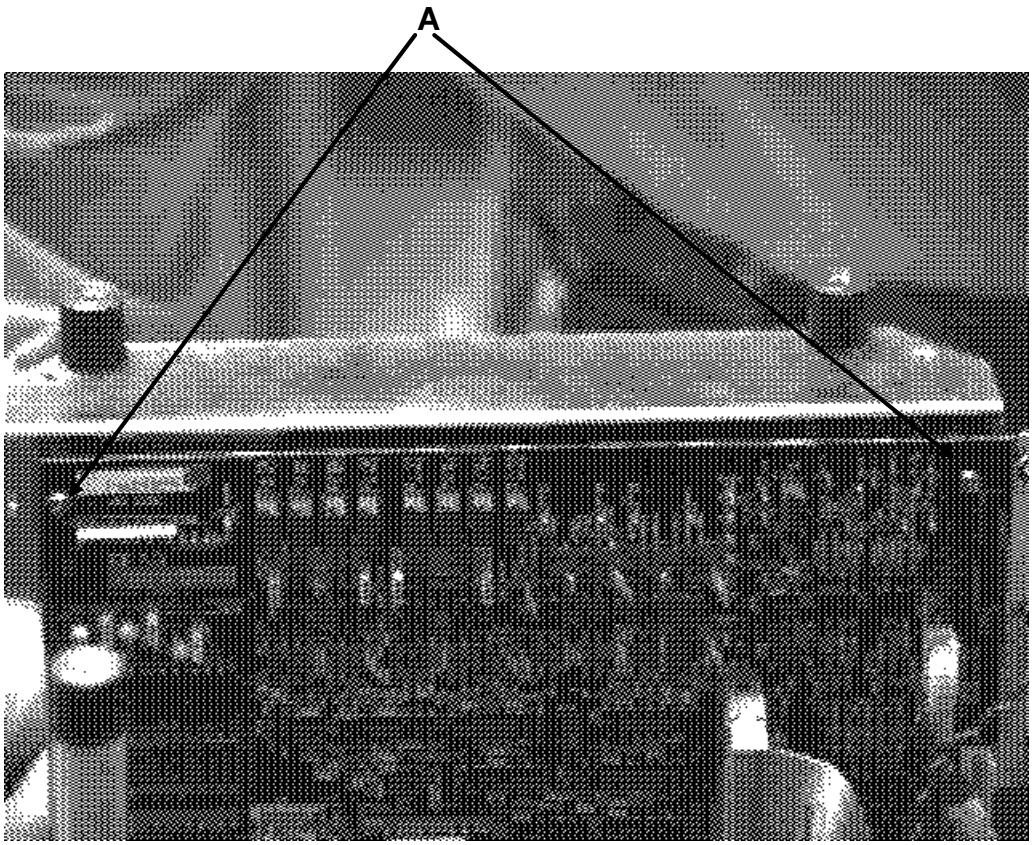


Figure 4-34 Removing the Board COM GEST2

PRINCIPLE OF OPERATION

The board COM GEST2 allows reader management and data acquisition from the optical block.

Information on components:

- 8-bit 6809-type microprocessor
- 4 Mhz frequency
- 64 Kb of static RAM
- 8 Kb of EPROM
- X Kb of EEPROM
- 2 VIA
- 2 ACIA
- 12-bit Analogue-Digital Converter

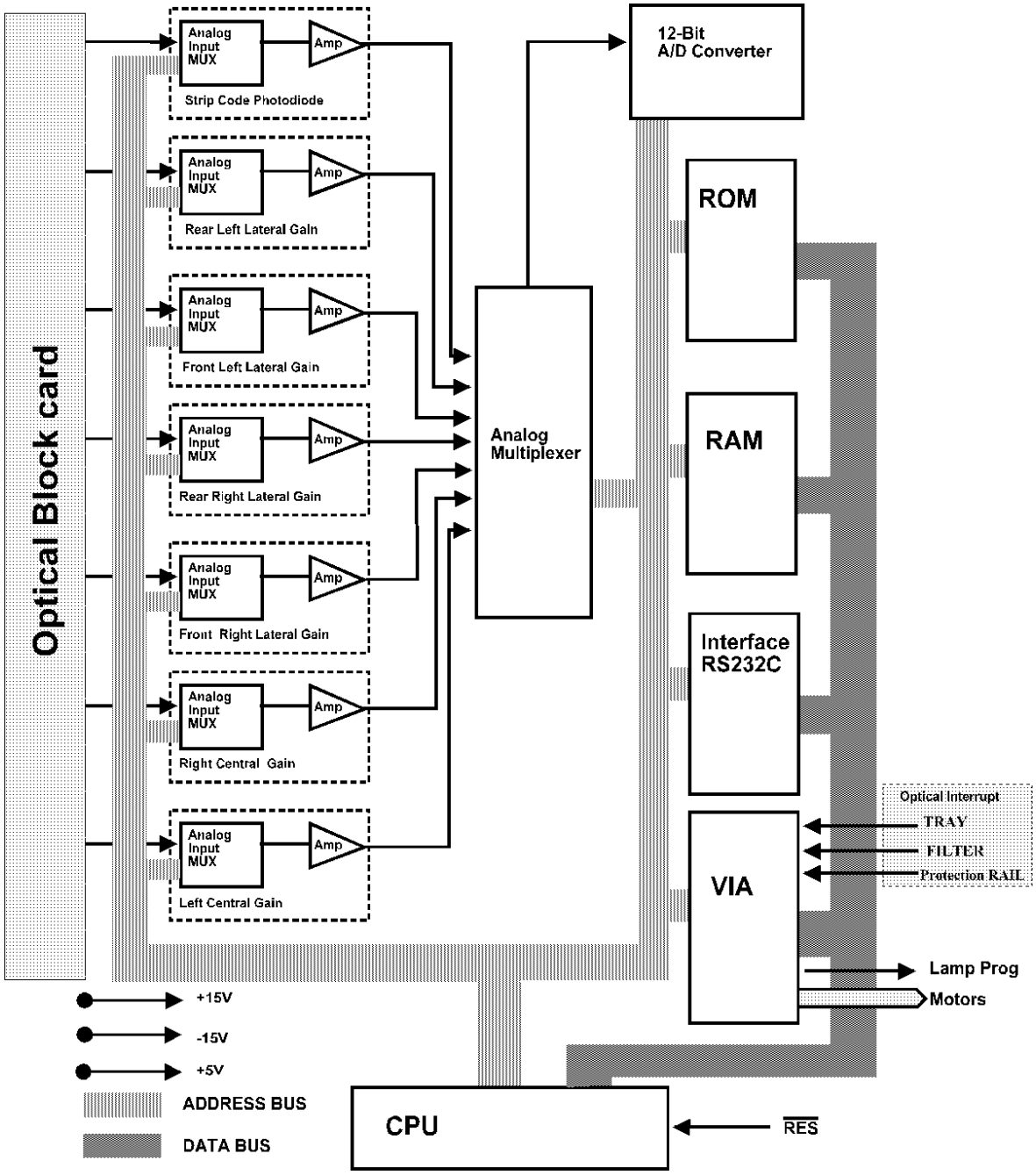


Figure 4-35 Management Block Diagram

RS 232 Serial Communication

The computer module manages the communication. It sends commands to the reader module which answers back.

A command is therefore the connection from the computer module to the reader module and an answer is the connection from the reader module to the computer module.

If the reader module is not ready or if it does not understand the message it sends a NACK to the computer module .

EPROM Version Communication

The computer module asks for the version:

STX M ETX for the EPROM Board COM GEST2

The reader module answers:

STX _/_/_/_/ ETX (E.g. : **STX 54.07 ETX**).

Checking the position of the Protection Rail

STX B ETX The reader module answers: **STX 0 ETX** if the protection rail is in.
The reader module answers: **STX 1 ETX** if the protection rail is out.

Initialisation of the Reader Module

Software initialisation:	**STX h ETX**	The reader module answers:	**CR**
Instrument operating:	**STX I ETX**	The reader module answers:	**STX I ETX**
Instrument waiting:	**STX O ETX**	The reader module answers:	**STX O ETX**

NOTE : After initialisation with <h>, operate the instrument by sending the **STX I ETX** order.

Reading Mode

– Selection

SELECTION	SELECTION COMMAND	RETURN MESSAGE IF READER IS READY
Nephelometry Colorimetry	**STX N ETX** **STX C ETX**	**STX N ETX** **STX C ETX**
Automatic recognition	**STX A ETX**	**STX A ETX**

– Selected Reading

The computer module asks which reading has been selected:
STX L ETX

The reader module answers: **STX N ETX** if nephelometric
STX C ETX if colorimetric
STX A ETX if automatic

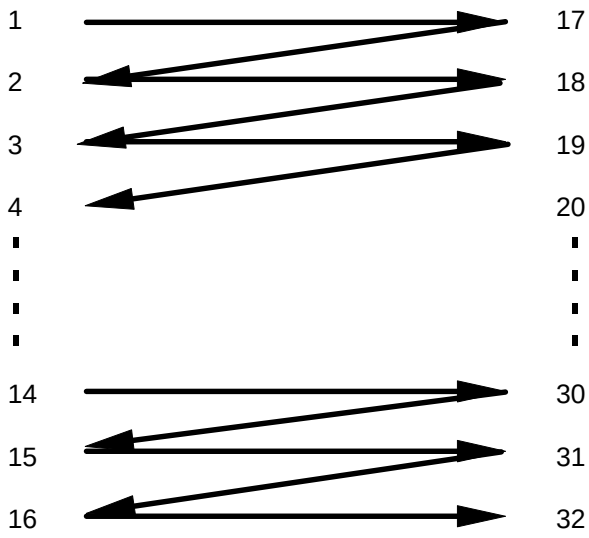
Reading

Each value transmitted is right-adjusted and includes 3 characters.

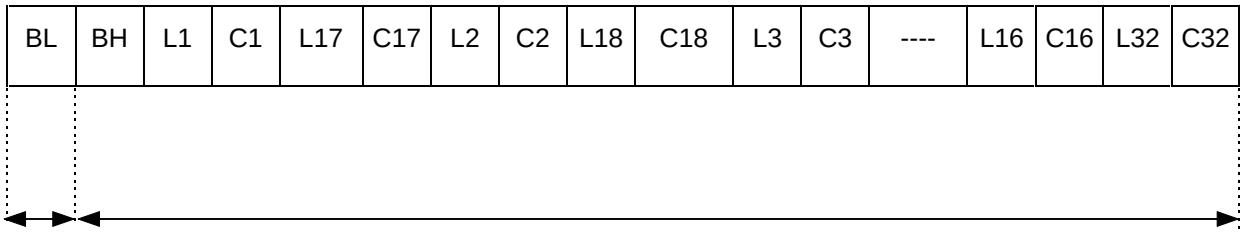
The command for starting the cycle is: **STX D ETX**

At the end of the cycle the reader sends values according to the diagram below (except when the motor alarm "**mini API out of order**" is set, in which case it answers: **STX H ETX CR**).

Nephelometric reading

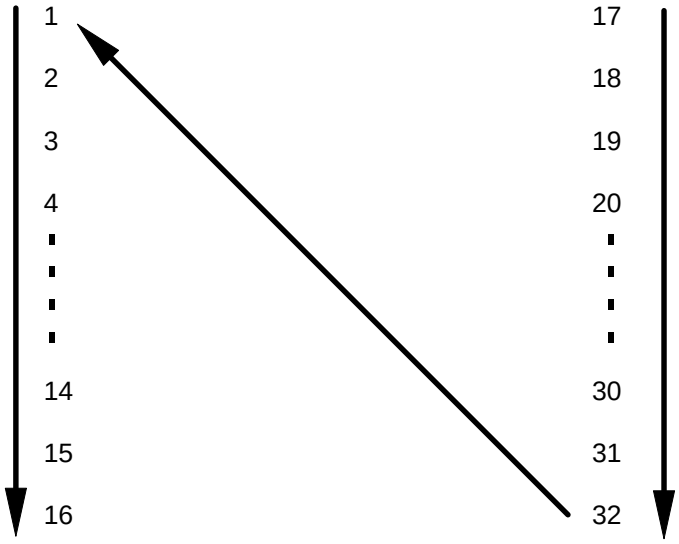


Tansmission Command



Message Diagram

Colorimetric reading



Transmission Command

		Cupule 17				Cupule 18				.....	Cupule 15				Cupule 16			
B	BH	F1	F2	F3	F4	F1	F2	F3	F4	.....	F1	F2	F3	F4	F1	F2	F3	F4

Data

F1 : Values under K60 filter carriage return
F2 : Values under K40 filter
F3 : Values under DT blue filter
F4 : Values under DT green filter

4 values x 3 characters x 32 cupules = 384 characters

Message Diagram

Alarm Messages

The computer module asks for alarm messages : **STX E ETX**

The reader module sends the alarm position according to the following diagram:

STX A1 A2 A3 A4 A5 ETX

Alarms 1 to 5 (see diagram) **0**: no alarm
1: alarm ON

	Definition	Trigger	Format
A1	Bad data transmission.		STX 10000 ETX
A2	Offset alarm.		STX 01000 ETX
A3	Reference values alarm.	95-220	STX 00100 ETX
A4	Maximum position of the Acquisition points alarm.		STX 00010 ETX
A5	Bad initialisation of motor. Reader out of service.		STX 00001 ETX

A2, A3 and A4 alarms only concern colorimetry.

When one of these alarms is on, the computer module may have access to the different corresponding values.

Offset Values (Message A2)

The computer module asks for these values : **STX 2 ETX**
The reader module answers by sending the values according to the following diagram.

ROF1	ROF2	ROF3	ROF4	LOF1	LOF2	LOF3	LOF4

Offset values

R: Right
O: Offset
L: Left

F1: K60 filter
F2: K40 filter
F3: DT blue filter
F4: DT green filter

8 values x 3 characters = 24 characters

Reference Values (Message A3)

The computer module asks for these values: **STX 3 ETX**
The reader module answers by sending the values according to the following diagram.

RRF1	RRF2	RRF3	RRF4	LRF1	LRF2	LRF3	LRF4

Reference values

R: Right
R:Reference
L: Left

F1: K60 filter
F2: K40 filter
F3: DT blue filter
F4: DT green filter

8 values x 3 characters = 24 characters

Position of the maximum value in the acquisition signal

The computer module asks for maximum value positions: **STX 3 ETX**
The reader module answers by sending the positions according to the following diagram.
The transmission order is the same as for colorimetry.

Cupule 17	Cupule 18	----------	Cupule 15	Cupule 16
P17	P18	----------	P15	P16

P: Maximum position

32 values x 2 characters = 64 characters

TESTING AND ALIGNMENT

Material required:

- Screwdriver for adjustment.
- Maintenance software.
- Nephelometric kit
- Colorimetric kit
- Petri dish of E. coli

CAUTION ! ***To adjust the board COM GEST2 you should adjust the power supply and alignment beforehand.***

WARNING ! ***To perform the adjustment procedure below, you should prepare different inoculated strips as follows:***
Set the spectrophotometer to wavelength 550 nm or using a densitometer.
Using a Petri dish of E. coli and an ampoule of AUX Medium, prepare a suspension for:
1 O.D. strip
0.6 O.D. strip
0.3 O.D. strip
Each strip should be used for three measurements only.
The strips must be used within 10 minutes of inoculation.

NOTE : Below is data on optical densities and their corresponding LEDs.

O.D.	1550 Densitometer	DENSIMAT
0.3	LED 21	1.6 McF
0.6	LED 25	2.6 McF
1	LED 28	4.2 McF

Management Card

Voltage V0 Adjustment

This adjustment allows you to obtain one precise voltage for +V and -V used for adjustment of OFFSETS.

Adjustment procedure:

- Connect DMM between P17 (AGND) and PT16 (+V) on the board COM GEST2.
- Adjust the P9 potentiometer on the board COM GEST2 until you obtain the voltage +5VDC +/- 0.01 V.
- Connect the positive probe of DMM to PT18 (-V0) and the ground probe to PT17 on the board COM GEST2.
- Make sure that the voltage of -V0 is -5VDC +/- 0.01V.
- Repeat this procedure until you obtain the right values.

Compensation Adjustment

Static Accuracy performance

The AD7111KN (U 26) on the board COM GEST2 accuracy is specified relative to 0dB attenuation, with "Gain" trim resistors P10 and R49.
It is used to adjust Vout = Vin precisely (i.e., 0dB attenuation) with input code 00000000.
This adjustment is done by the manufacturer.

Colorimetric Adjustment

Adjustment Procedure:

After initialisation of the system and the Maintenance Software (see Chapter 10), follow the instructions below.

- First of all the FILTRO.DAT file from the maintenance software must be updated with the values written on the neutral filter (colorimetric kit) (see Chapter 10).

E2PROM Initialisation (optional)

- Select the INIT E2PROM option in the adjustment menu (F2).
- Init E2PROM.

The software runs automatically.

NOTE : The E2PROM initialisation automatically involves performing the nephelometric procedure.

After the E2PROM initialisation the tray may be ejected. If so, you have to decrease the attenuation in "**Set strip code**" in the colorimetric part of the 1525N maintenance software. You should decrease the attenuation until the tray is no longer ejected (see page 4-55).

Central Gain Adjustment in Colorimetry

- Select the **COLORIMETRY** option (in the ATB 1525N module).
- Select the **SET AUTOMATIC** option in the adjustment menu (F2).
- Enter the reference value for each filter (**Reference value: 190**). The software automatically calculates the attenuation gain to obtain the references.
  The reference value can be different (between 130 and 200).
  The reference value must be obtained with a gain other than 0.

NOTE : For this step you must not put the neutral filter of the colorimetric kit on the tray during the cycle.

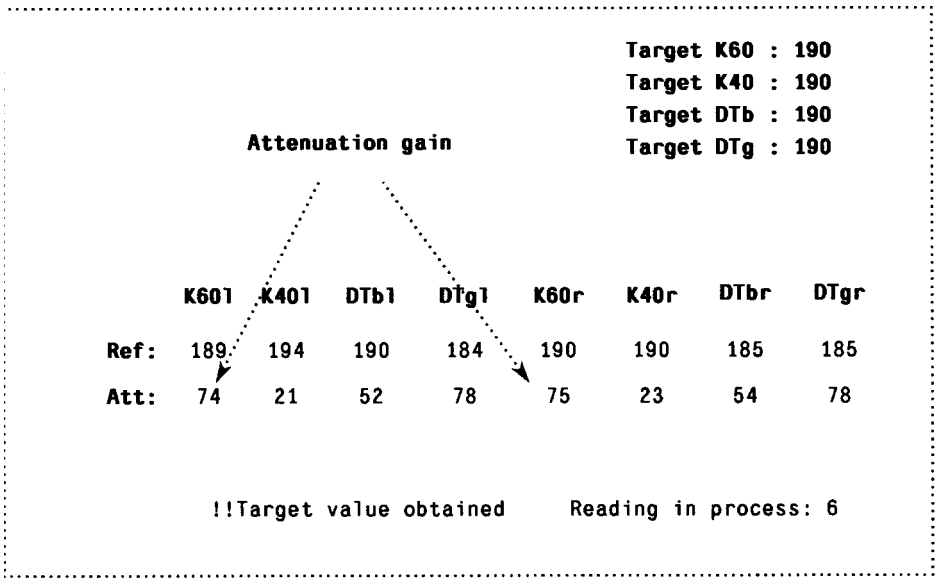

Target K60 : 190
Target K40 : 190
Target DTb : 190
Target DTg : 190
Attenuation gain
K60l K40l DTbl DTgl K60r K40r DTbr DTgr
Ref: 189 194 190 184 190 190 185 185
Att: 74 21 52 78 75 23 54 78
!!Target value obtained
Reading in process: 6

Figure 4-36 Maintenance Software Window (reference Option)

NOTE : If the message **"!!Target value OUT!!**" appears after the calibration, repeat the SET AUTOMATIC option.

Tray Initialisation

– Select the **INIT TRAY** option in the calibration menu.

The software automatically initialises the tray (it takes a tray image).

IMPORTANT ! In order to store the values you must perform the validation reading.

Validation Reading in Colorimetry

This function allows you to validate and store the attenuation gains in the E2PROM after a colorimetric reading.

– Press the **ESC** key to exit the calibration menu.

– Press the **F3** command and select the **COLORIMETRIC** option in the **READING** menu.

NOTE : Before running the reading, put the neutral filter of the colorimetric kit on the tray.

After the reading, check that the values are correct (see example in table below). The difference between the Ave value and the Filter value should not be more than 2.

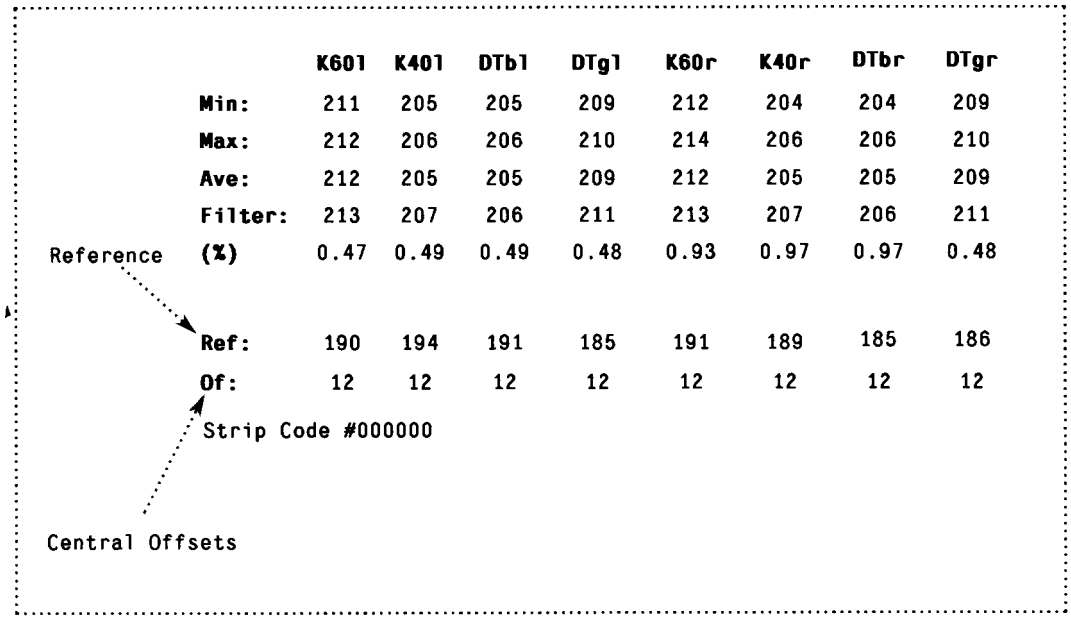


Figure 4-37 Maintenance Software Window (Reading Option)

Nephelometric Adjustment

Central Offsets Adjustment for Nephelometry

– Select the **ADJ. OFFSETS** option.

The software automatically calculates the attenuation gain to obtain the correct values with central offsets.

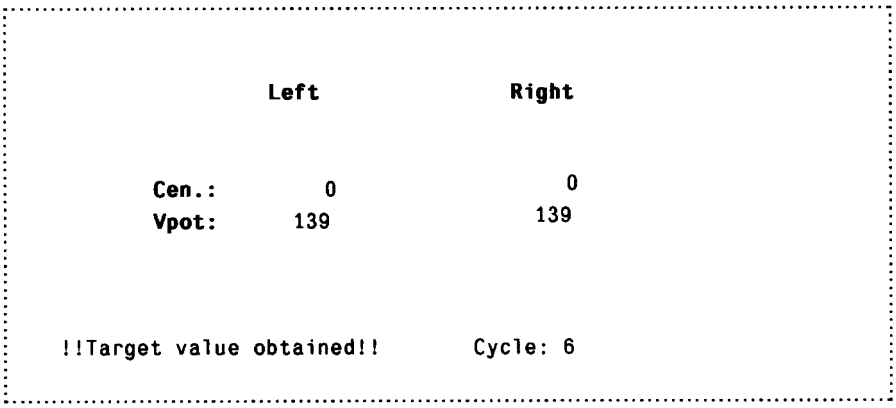


Figure 4-38 Maintenance Software Window (Offset Option)

Central Gain Adjustment in Nephelometry

– Select the **SET AUTOMATIC** option in the calibration menu.
– Select the **NEPHELOMETRY** option.
– Enter the reference value which is written on the neutral filter.

The software automatically calculates the attenuation gain to obtain the references.

NOTE : For this step you must put the neutral filter of the colorimetric kit on the tray during the cycle.

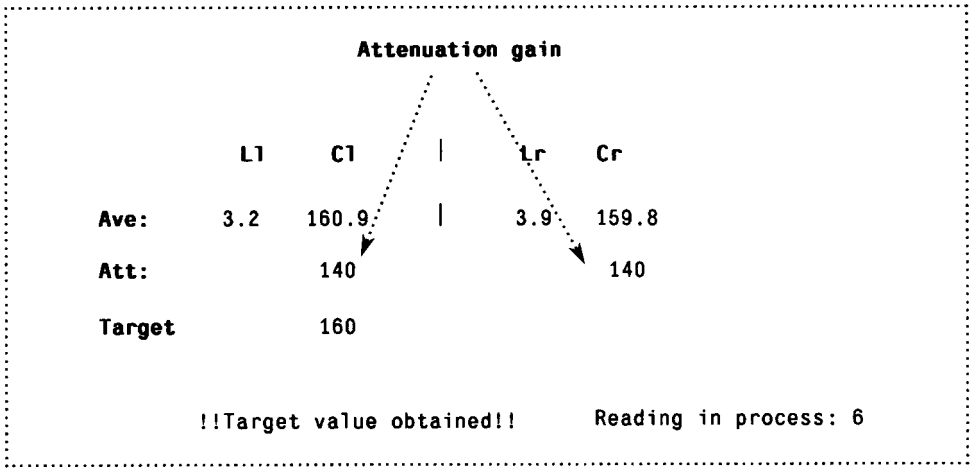


Figure 4-39 Maintenance Software Window (Reference Option)

NOTE : If the message **"!!Target value OUT!!**" appears after the calibration, repeat the **SET AUTOMATIC** option.

Validation Reading in Nephelometry

This function allows you to validate and store the attenuation gains in the E2PROM after a nephelometric reading.

– Press the **ESC** key to exit the calibration menu.

– Press the **F3** command and select the **NEPHELOMETRY** option in the **READING** menu.

NOTE : Before running the reading, put the neutral filter of the colorimetric kit on the tray.

After the reading, check that the values are correct (see example in table below). The difference between the Ave value and the Filter value should not be more than 2.

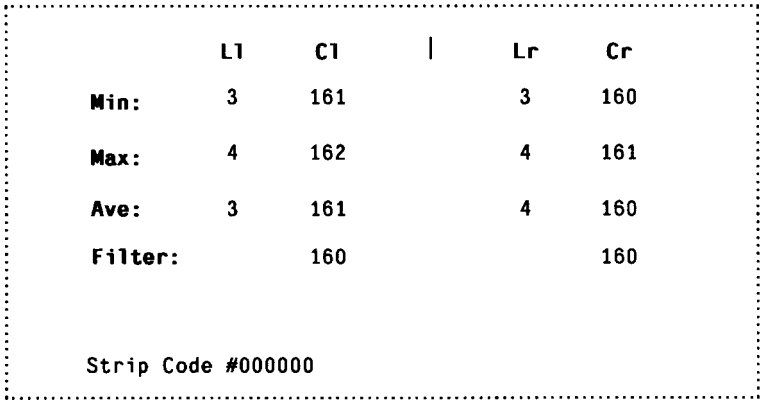


Figure 4-40 Maintenance Software Window (Reading Option)

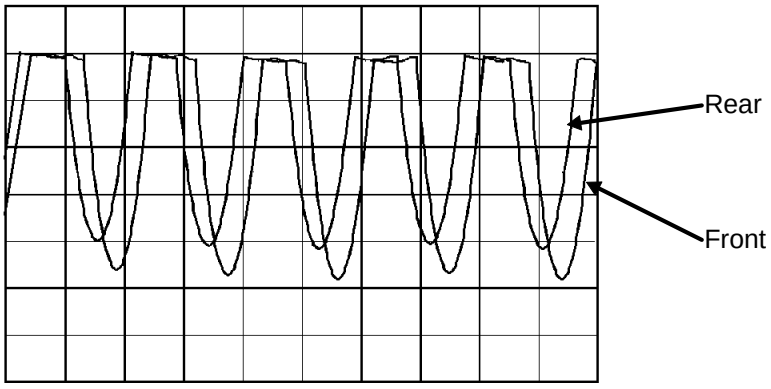


Figure 4-41 Lateral Balancing of Left and Right Channels

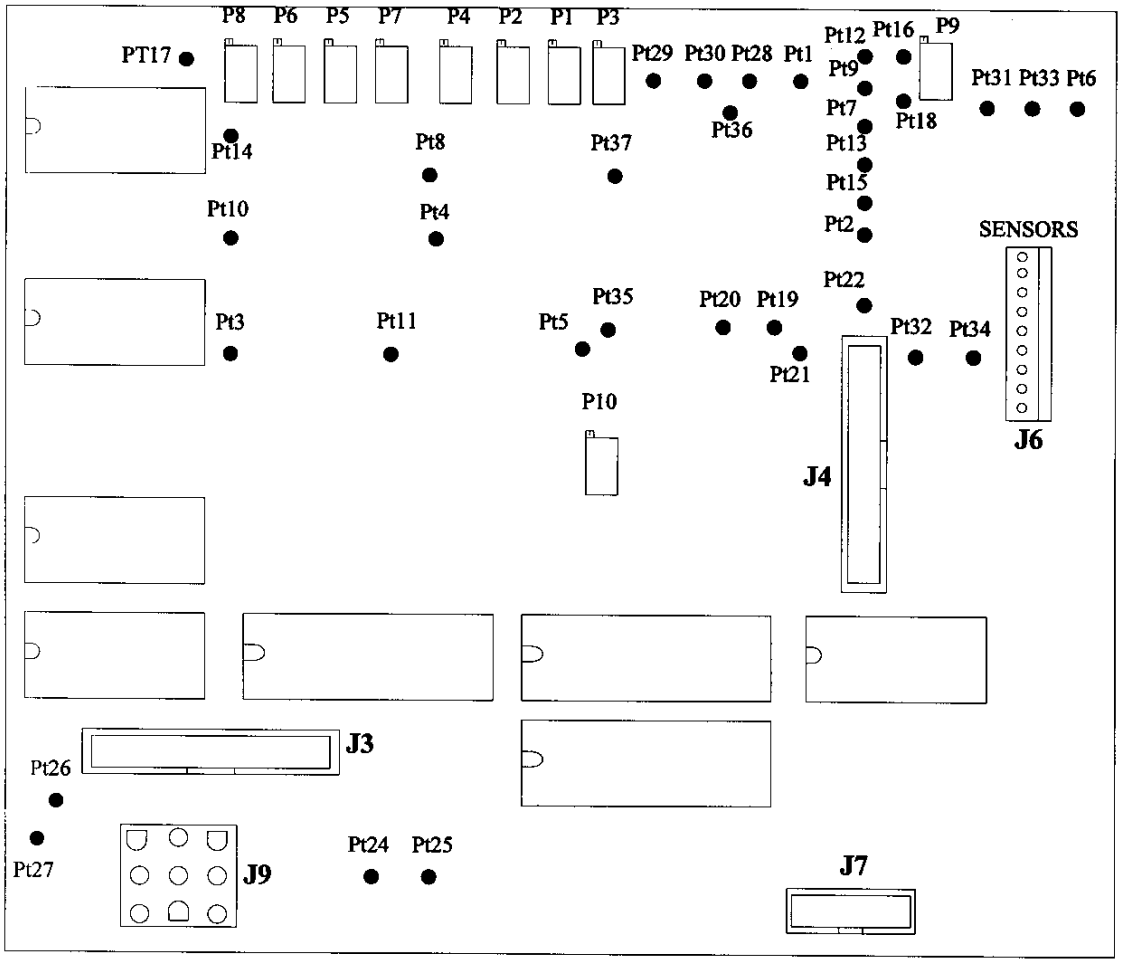


Figure 4-42 Board COM GEST2 Test and Adjustments points

Lateral Gain in Nephelometry

To adjust the lateral gain, carefully follow the instructions in the maintenance software. The software programs for adjustment in colorimetric and nephelometric mode are not the same.

Adjustment Procedure:

After initialisation of the system and the Maintenance Software (see Chapter 10), follow the instructions below.

Adjusting the OFFSETS

Use the ATB 1525 Maintenance Software module.

Adjusting the Lateral Offsets.

- Select the **LATERAL OFFSETS** option in **ADJUSTMENT**.
- Adjust with **P4** and **P8** potentiometers to obtain the value in brackets.

Adjusting the Lateral Balancing.

★ Adjust the left channel lateral balancing signals as follows:

Use the ATB 1525 N (colorimetric option) Maintenance Software module.

On the board COM GEST2:

- Ground of the oscilloscope to PT17.
- Channel A of the oscilloscope to PT5 (Lateral left rear photodiode).
- Channel B of the oscilloscope to PT8 (Lateral left front photodiode).

- Turn the P1 and P2 potentiometers counterclockwise (decrease the resistance) as far as possible.

- Carry out one turn in a clockwise direction on each of the above-mentioned potentiometers.

- Put the strip inoculated with *E. coli* (O.D. 1) on the tray.

- Select the balancing option (Later. Bal.) from the **F2** adjustment menu.

The tray begins a back and forth cycle.

- Detect which channel gives the lowest level signal on the oscilloscope.

- Turn the corresponding potentiometer clockwise so that the signals on channels A and B of the oscilloscope are equal (see Figure 4-41).

★ Adjust the right-hand channel lateral balancing signals as follows:

On the management card:

- Ground of the oscilloscope to PT17.
- Channel A of the oscilloscope to PT11 (Lateral right rear photodiode).
- Channel B of the oscilloscope to PT14 (Lateral right front photodiode).

– Turn the P5 and P6 potentiometers counterclockwise (decrease the resistance) as far as possible.

– Carry out one turn in a clockwise direction on each of the above-mentioned potentiometers.

– Put the strip inoculated with *E. coli* (O.D. 1) on the tray.

– Select the balancing option (Later. Bal).

The tray begins a back and forth cycle.

– Detect which channel gives the lowest level signal on the oscilloscope.

– Turn the corresponding potentiometer clockwise so that the signals on channels A and B of the oscilloscope are equal (see Figure 4-41).

Adjusting the Lateral Gains in Dynamic Reading

Use the ATB 1525 Maintenance Software module.

- Put an inoculated strip (O.D 0.6 - 135 µl) on the tray.
- Select the option **F10-Reading** and **NEPHELOMETRIC Reading** mode.
- Start a reading.

As soon as the reading is over,

- Interpret the table in the Help Menu (by pressing **F1**).
- Adjust potentiometers **P3** and **P7** for Lateral Gains to obtain the correct values (see Table D).
- Repeat the last three steps until you obtain the right values. If necessary (after three readings) inoculate another strip.

Once the adjustment has been performed, the reading of an inoculated strip with an O.D. of 0.3 will confirm it.

To check, use the procedure for Lateral Gains in Dynamic Reading and refer to Table E.

0.6 O.D	Average	Var Maxi	Mini	Maxi
Central	--	8	--	--
Lateral	88/98	4	--	--
Division	130/150	7	120	160

Table D - Help Table for 0.6 O.D. Strip

0.3 O.D	Average	Var Maxi	Mini	Maxi
Central	--	--	--	--
Lateral	--	--	--	--
Division	70/85	6	60	93

Table E - Help Table for 0.3 O.D. Strip

SECTION 4.6 BORD INTERFACE SERIAL LCD CPU

SECTION CONTENTS

This section includes:

	Page
REMOVING THE BOARD INTERFACE (450 0625A)	4-88
CABLE CONNECTIONS	4-89
PRINCIPLE OF OPERATION	4-90

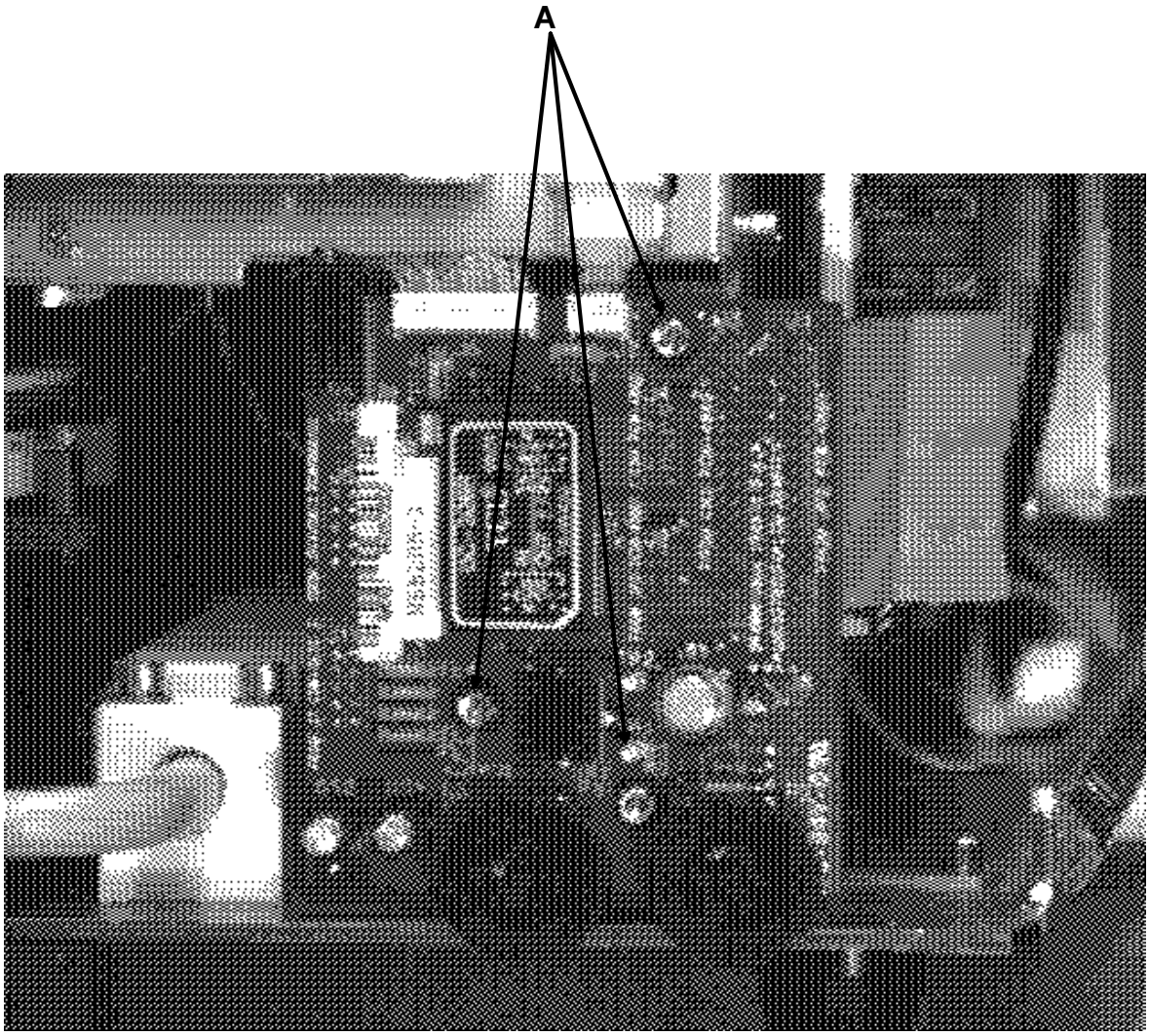


Figure 4-43 Removing the Board Interface

REMOVING THE BOARD INTERFACE (450 0625A)

- Remove the casing (page 4-21).
- Disconnect the cables from connectors J10, J1, J5, J2, J7, J9 and J6 on the board interface serial LCD CPU.
- Remove the 3 MXx6 CHC screws (A).
- Remove the board.

CABLE CONNECTIONS

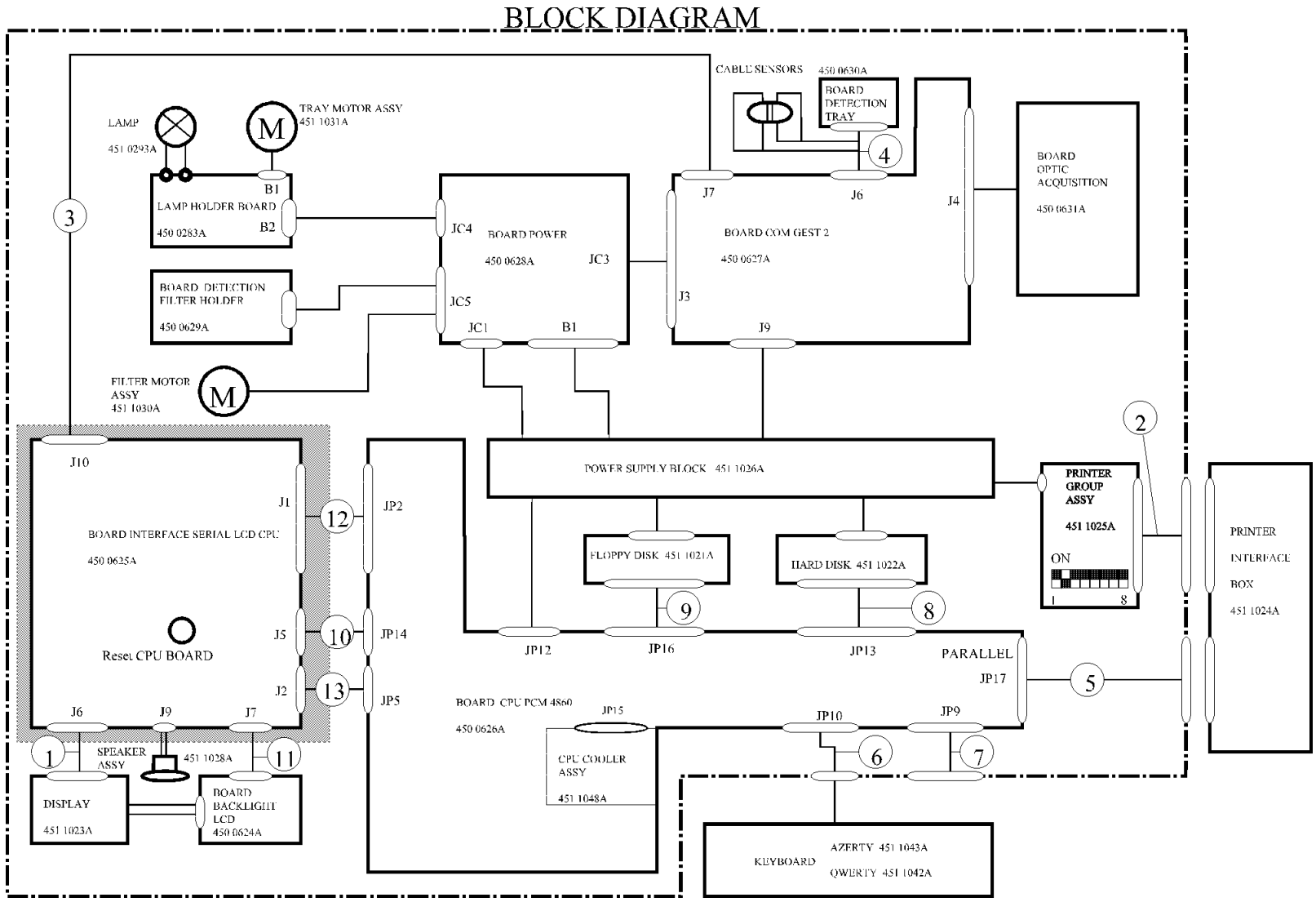


Figure 4-44 Board Interface Serial LCD CUP Cable Connections

PRINCIPLE OF OPERATION

The Board Interface Serial LCD CPU has 3 main functions.

1) It is connected to the Board CPU PCM 4860 via the J2 connector and receives the following data:
   - - presence of a power supply indicated by the green LED.
   - - hard disk operating: orange LED.
   - - signals for the speakers.

   If you touch SW1, the microprocessor will reset.

2) Via J1, J6, J7 the board dispatches data required by the screen.

   The integrated power supply (U1) supplies current of _ 17.7 V to the screen.

   The P1 and P2 potentiometers enable you to adjust the contrast and brightness of the screen.

3) Via J5 and J8 the board ensures the RS 232 connection between the Board COM GEST2 and the Board CPU PCM 4860. This function also includes filtering of signals (EMC standard).

SECTION 4.7 COMPUTER BLOCK

SECTION CONTENTS

This section includes:

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• Removing the Board CPU PCM 4860 (450 0626A)	4-98
SPECIFICATIONS	4-99
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JUMPERS AND CONNECTORS	4-102
SIMM MEMORY MODULES	4-105
DETAILED INFORMATION ON SERIAL PORTS	4-106
JUMPER SETTINGS	4-108
FLOPPY DRIVE	4-109
• Features	4-109
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• Features	4-110
DISPLAY	4-112
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CABLE CONNECTIONS	4-113
• Electrical Absolute Maximum Ratings	4-114
• Environmental Absolute Maximum Ratings	4-114
• Electrical Characteristics of Backlight	4-115
• Precautions for Use	4-115
• Storage	4-115
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CABLE CONNECTIONS

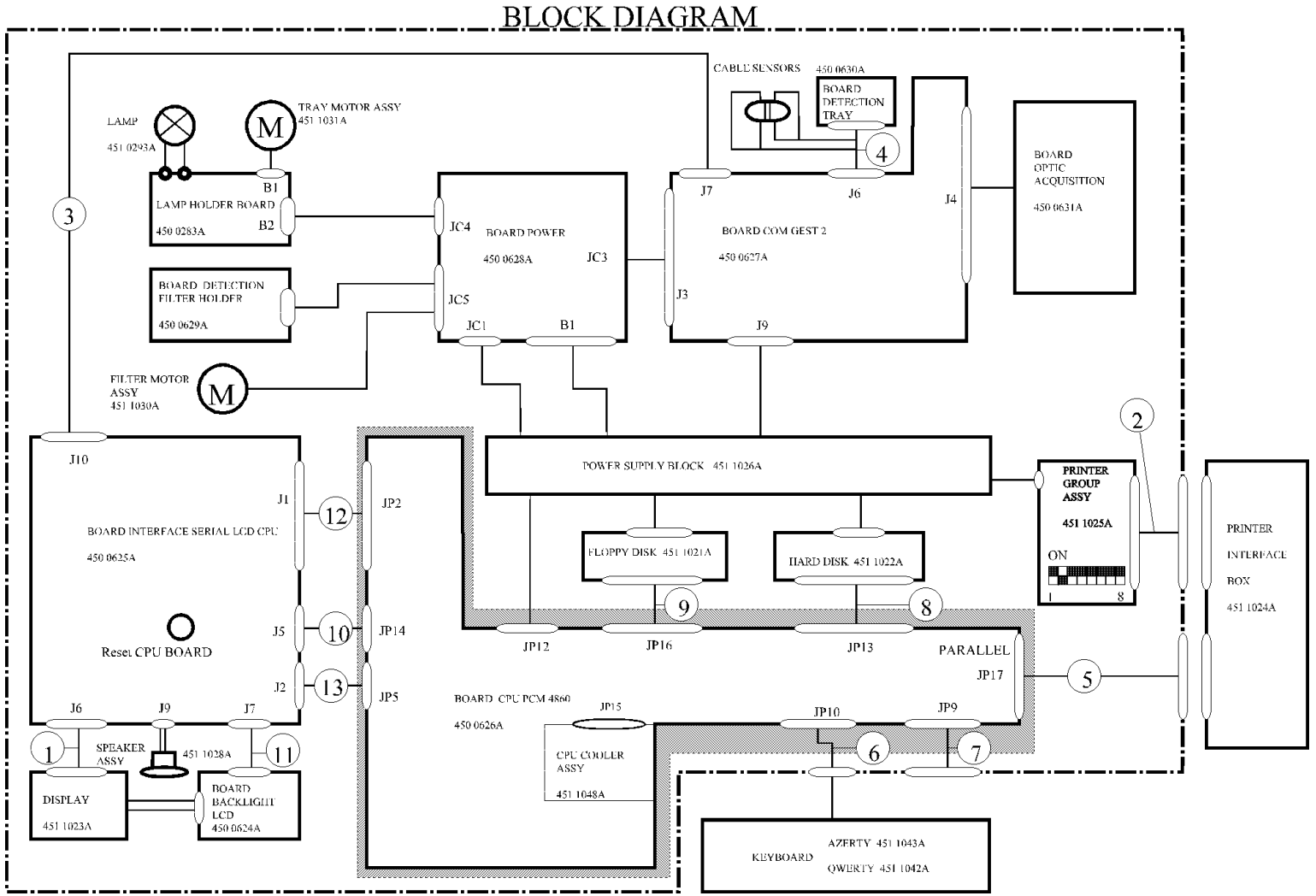


Figure 4-45 Computer Cable Connections

CENTRAL PROCESSING UNIT

The Central Processing Unit (CPU) is installed on the CPU board.

It is:

ST 486 DX2-66 MHz

Voltage: 5 VDC.

BOARD CPU PCM 4860 (450 0626A)

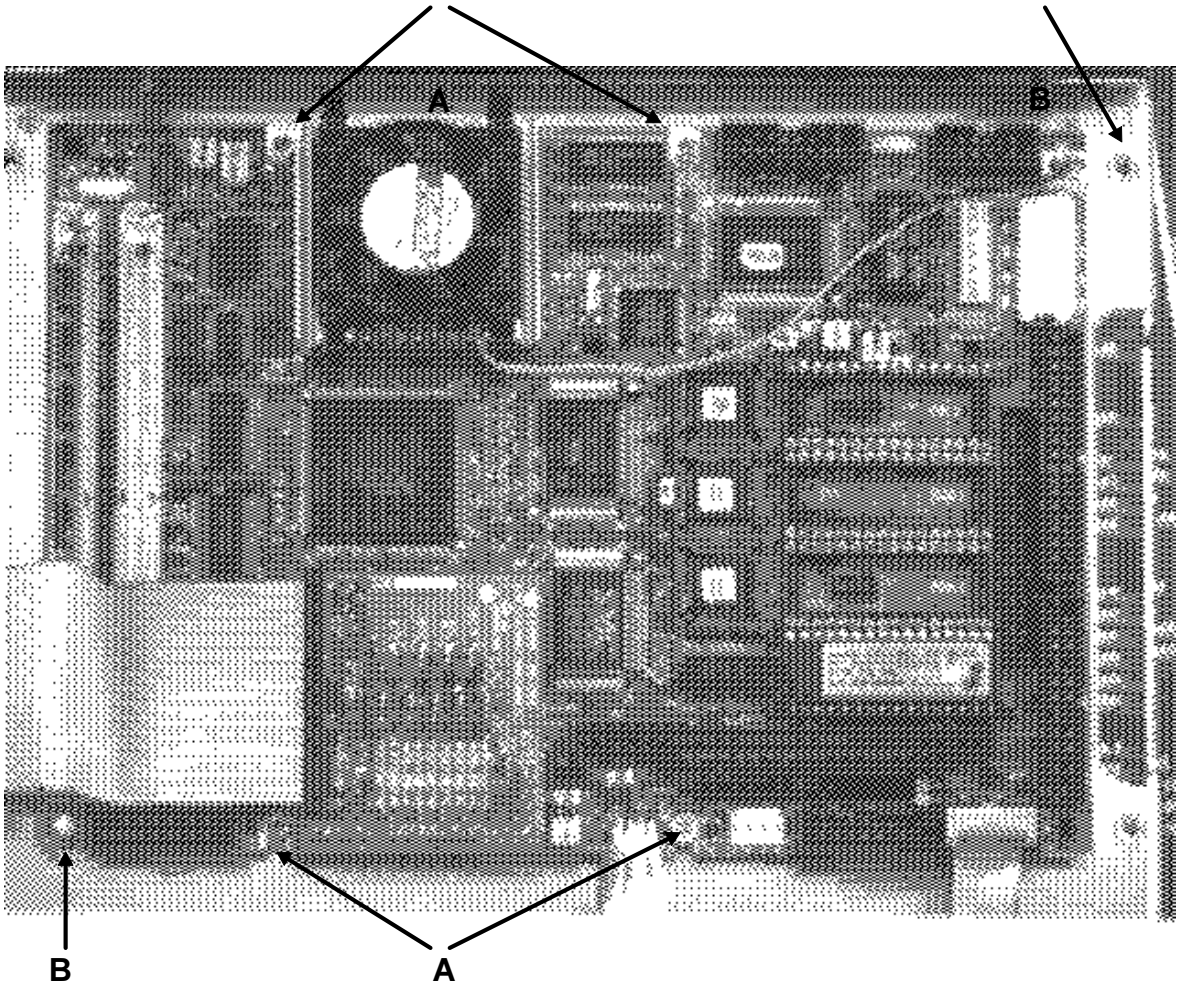


Figure 4-46 Removing the Board CPU PCM 4860

INTRODUCTION

The PCM-4860 is an all-in-one single board computer that provides a compact, complete, high-performance, PC/AT compatible system.

The PCM-4860 comes equipped with a 486 CPU. It features two 72-pin DRAM SIMM sockets, an IDE hard disk controller, a floppy disk controller, two serial ports, and a bi-directional parallel port.

Safety Precautions

Follow these simple precautions to protect yourself from harm and your system from damage.

WARNING ! ***To avoid electric shock always disconnect the power from your system chassis before you work on it. Do not touch any components of the board or other cards while the PC is on.***

Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

Always ground yourself to remove any static charge before you touch your board. Be particularly careful not to touch the chip connectors. Modern integrated electronic devices, especially CPUs and memory chips, are extremely sensitive to static electric discharges and fields. Keep the card in its antistatic packaging when it is not installed in the PC and place it on a static dissipative mat when you are working on it. Wear a grounding wrist strap 455 0272A for continuous protection when working on the board CPU PCM4860.

Removing the Board CPU PCM 4860 (450 0626A)

- Remove the casing (page 4-21).
- Put on the antistatic wrist strap and connect it to a metallic part of the instrument.
- Remove the cables from connectors JP2, JP14, JP5, JP12, JP16, JP13, JP17, JP10 and JP9.
- Remove the 4 M3x6 CHC screws from the board (A).
- Remove the board from the 2 plastic clips (B).
- Remove the board.

SPECIFICATIONS

Standard SBC functions

CPU

80486DX2-66 MHz

Bus interface

ISA (PC/AT) bus

Data bus

16 bit

Processing ability

32 bit

Chipset

VIA VT82C486A

RAM memory

1 MB to 32 MB. Accepts 1, 2, 4, 8 or 16 MB SIMMs (for 1, 2, 4, 8, 16 and 32 MB configuration).

IDE hard disk drive interface

Supports up to two IDE (AT bus) hard disk drives (enabled/disabled).

CMOS backup

CMOS data backup in DS12885Q, avoiding data loss.

Floppy disk drive interface

Supports up to two floppy disk drives, 5¼" (360 KB and 1.2 MB) and/or 3½" (720 KB, 1.44 MB and 2.88 MB).

(BIOS enabled/disabled).

Bi-directional parallel port

Configurable to LPT1, LPT2, LPT3 or disabled.

Serial ports

One serial RS-232 port and one serial RS-323/RS-422/RS-485 port, jumper selectable. Both with 16C550 UARTs (or compatible) with 16-byte FIFO buffer. Supports speeds of up to 115 Kbps. Ports can be individually configured as COM1, COM2, COM3, COM4 or disabled.

Real-time clock/calendar

Uses DS-12885Q RTC chip and quartz oscillator, powered by a lithium battery for 10 years of data retention.

DMA controllers

2 x 87C37A

DMA channels

7

Interrupt controllers

2 x 87C59A

Interrupt levels

15

Keyboard/mouse connector

An 8-pin Connector supports standard PC/AT keyboards and PS/2 mouse.

Bus speed

8 MHz

Max. power requirements

+5 V @ 2 A

Power supply voltage

+5 V (4.75 V to 5.25 V)

Operating temperature

0 to 60°C

Board Size

203 mm x 146 mm

EMI

Pending

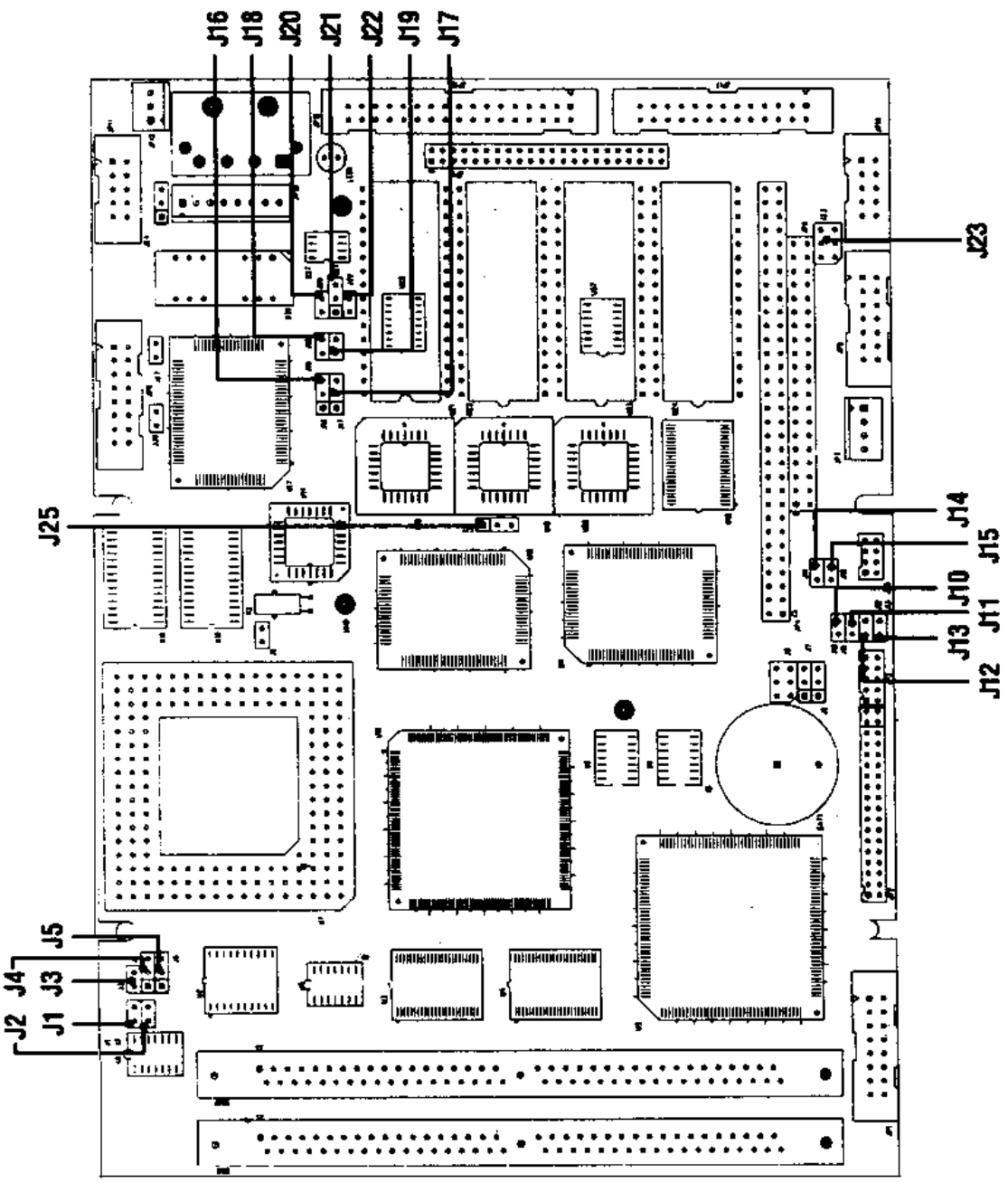


Figure 4-47 PCM-4860 Jumpers

JUMPERS AND CONNECTORS

Connectors on the board link it to external devices such as hard disk drives or a keyboard. In addition, the board has a number of jumpers which you use to configure it for your application.

The table below lists the function of each of the board jumpers and connectors. Later sections in this chapter give instructions on setting jumpers and detailed information on each jumper setting.

PCM-4860 Jumpers	
Number	**Function**
J1	CPU frequency selection
J2	CPU frequency selection
J3	CPU type selection
J4	CPU type selection
J5	CPU type selection
J10	SSD memory address selection
J11	SSD memory address selection
J12	SSD I/OO address selection
J13	SSD I/O address selection
J14	SSD drive emulated
J15	SSD drive emulated
J16	Parallel port IRQ selection
J17	SSD Flash/ROM device selection
J18	Watchdog timer enable/disable
J19	Watchdog timer invokes IRQ 15
J21	SSD 1 MB/4 MB ROM device selection
J22	Watchdog timer invokes system reset
J23	COM2 RS-232/RS-422/RS-485 selection
J25	SSD hardware enable/disable

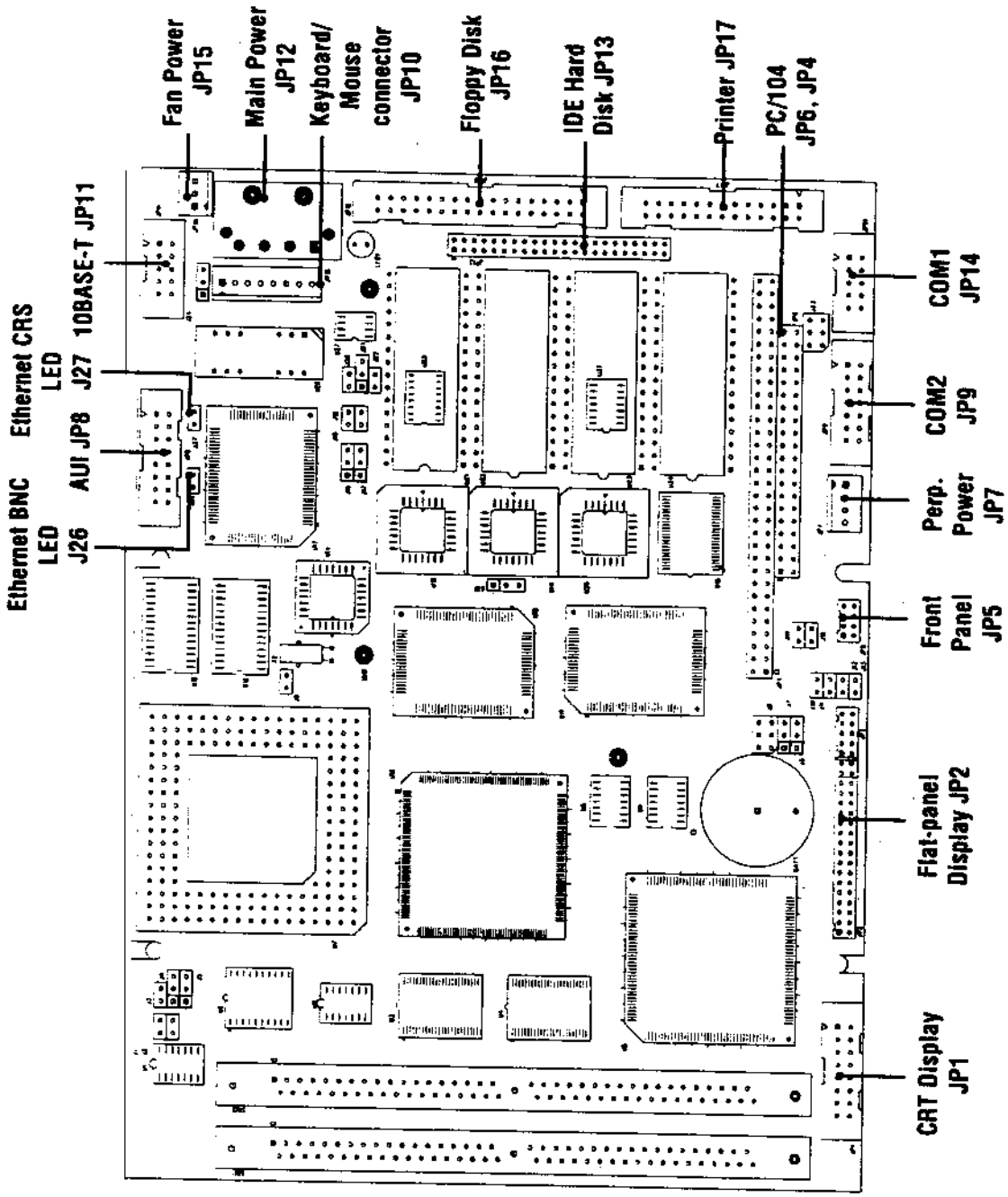


Figure 4-48 PCM-4860 Connectors

PCM-4860 Connectors	
Number	Function
JP1	CRT display connector
JP2	Flat panel display connector
JP4	PC/104 ISA-bus expansion
JP5	Front panel connector
JP6	PC/104 ISA-bus expansion
JP7	Peripheral power connector (-5 V, -12 V)
JP8	10BASE-2/10Base-5 AUI connector
JP9	RS-232/RS-422/RS-485 serial port
JP10	Keyboard and mouse connector
JP11	10BASE-T connector
JP12	Main power connector (+5 V, +12 V)
JP13	IDE connector
JP14	RS-232 serial port
JP15	CPU fan power connector
JP16	Floppy connector
JP17	Printer/parallel port connector
J26	Ethernet BNC LED
J27	Ethernet CRS LED

SIMM MEMORY MODULES

On the left end of the card are the two 72-pin SIMM (Single In-line Memory Module) sockets which hold the card's DRAM memory.

You can install anywhere from 1 MB to 32 MB of on-board DRAM memory using 1, 2, 4, 8 or 16 MB 72-pin SIMMs (Single In-line Memory Modules). Access time should be 70 nsec. or less.

Memory installs in two banks composed of one SIMM socket each. Unlike most other CPU cards, the PCM-4860's chipset supports single and dual SIMM insertion into the memory banks.

The procedure for installing SIMMs appears below. Please follow these steps carefully.

- Ensure that all power supplies to the system are switched Off.
- Locate the board's memory banks.
- Install the SIMM cards. Install each SIMM so that its chips face away from the CPU and its gold pins point down into the SIMM socket.
- Slip each SIMM into a socket at a 45 degree angle and carefully fit the bottom of the card against the connectors.
- Gently push the SIMM into a perpendicular position until the clips on the ends of the SIMM sockets snap into place.
- Check to ensure that each SIMM is correctly seated and all connector contacts touch. The SIMM should not move around in its socket.

DETAILED INFORMATION ON SERIAL PORTS

This section contains information of a detailed or specialised nature. It includes:

- RS-232/422/485 Serial Port Connector
- RS-232 Serial Port Connector

RS-232 Port Connector (JP14)

PCM-4860 RS-232 Port Connector	
Pin	**Signal**
1	DCD
2	DSR
3	RxD
4	RTS
5	TxD
6	CTS
7	DTR
8	RI
9	GND
10	N/C

RS-232/422/485 Serial Port (JP9)

PCM-4860 RS-232/422/485 Serial Port	
Pin	**Signal**
1	DCD
2	DSR
3	RxD
4	RTS
5	TxD
6	CTS
7	DTR
8	RI
9	GND
10	GND
11	485 TxD+
12	485 TxD-
13	485 RxD+
14	485 RxD-

JUMPER SETTINGS

PCM-4860 Jumpers

Number	Function	Setting
J1	CPU frequency selection	Closed
J2	CPU frequency selection	Closed
J3	CPU type selection	Closed
J4	CPU type selection	Closed 1-2
J5	CPU type selection	Closed 1-2
J10	SSD memory address selection	Closed
J11	SSD memory address selection	Open
J12	SSD I/OO address selection	Closed
J13	SSD I/O address selection	Closed
J14	SSD drive emulated	Closed
J15	SSD drive emulated	Open
J16	Parallel port IRQ selection	Closed 2-3
J17	SSD Flash/ROM device selection	Closed 1-2
J18	Watchdog timer enable/disable	Closed
J19	Watchdog timer invokes IRQ 15	Closed
J21	SSD 1 MB/4 MB ROM device selection	Closed 1-2
J22	Watchdog timer invokes system reset	Closed
J23	COM2 RS-232/RS-422/RS-485 selection	Closed 1-2
J25	SSD hardware enable/disable	Closed 2-3

FLOPPY DRIVE

Features

Supplier

EPSON

Type

SMD-1340

Format

3½"

Capacity

1.44 MB

Removing the Floppy Drive and Hard Disk

- Remove the casing (page 4-21).
- Remove the printer (page 4-119).
- Disconnect the cables from connectors JP9, JP10, JP13, JP16, JP17 on board CPU.
- Disconnect the power supply connectors on the hard disk and floppy disk.
- Remove the 3 M4x8 CHC screws on the back of the instrument and lift off the back panel.
- Remove the 5 M3x6 CHC screws from the floppy drive and pull it out from the back panel.
- Remove the 4 screws from the hard disk and remove the hard disk.

HARD DISK

Features

Supplier

FUJITSU

Type

M2614T AU

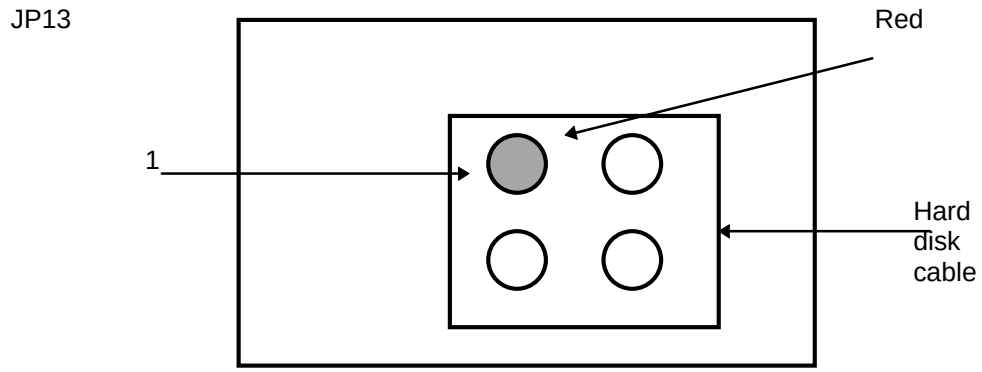
Format

3½"

Capacity

1.091 GB

CAUTION ! ***When you connect the hard disk cable to the JP13 connectors on the Board CPU PCM 4860, put the red cable in position 1.***



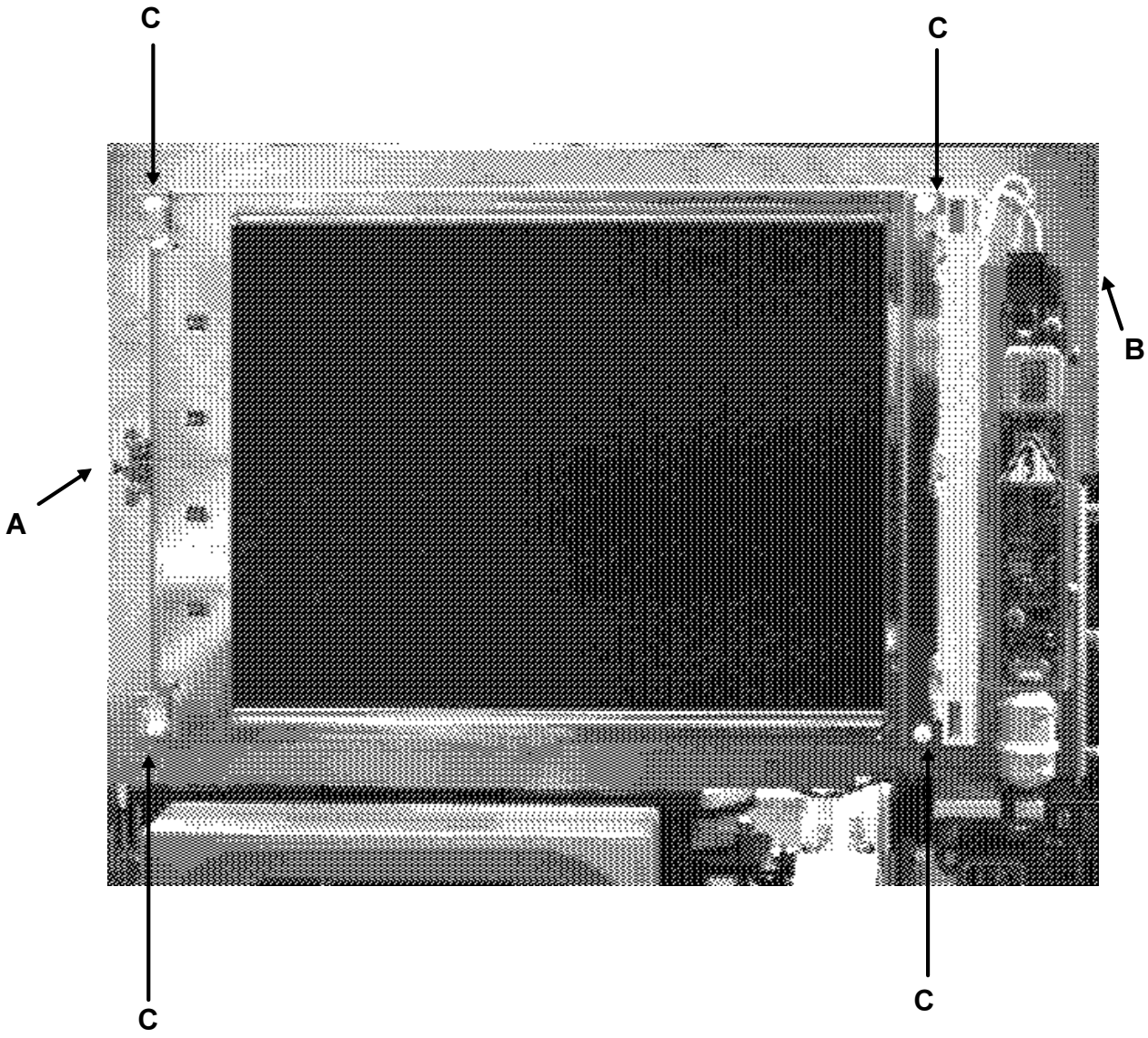


Figure 4-49 Display

DISPLAY

Mechanical Data

Part Name

LMG5278XUFC

Module Size

257.5(W) mm x 174.0(H) mm x 7.0(D) mm max.

Dot Size

0.27(W) mm x 0.27(H) mm.

Dot Pitch

0.30(W) mm x 0.30(H) mm.

Number of Dots

640(W) x 480(H) Dots

Duty

1/242 (Display is divided into 2 blocks).

LCD

Film type black/white (negative).
The upper polariser is anti-glare (Hardness 3H).
The bottom polariser is transmissive.

Viewing Direction

12 o'clock.

Back Light

Cold cathode fluorescent lamp.

Removing the Display (451 1023A)

- Remove the casing (page 4-21).
- Disconnect the cables from the connectors (see A and B in Figure 4-49).
- Remove the 4 plastic screws (C).

CAUTION ! Do not loosen the 4 plastic spacers on the screws.

- Remove the display.

CABLE CONNECTIONS

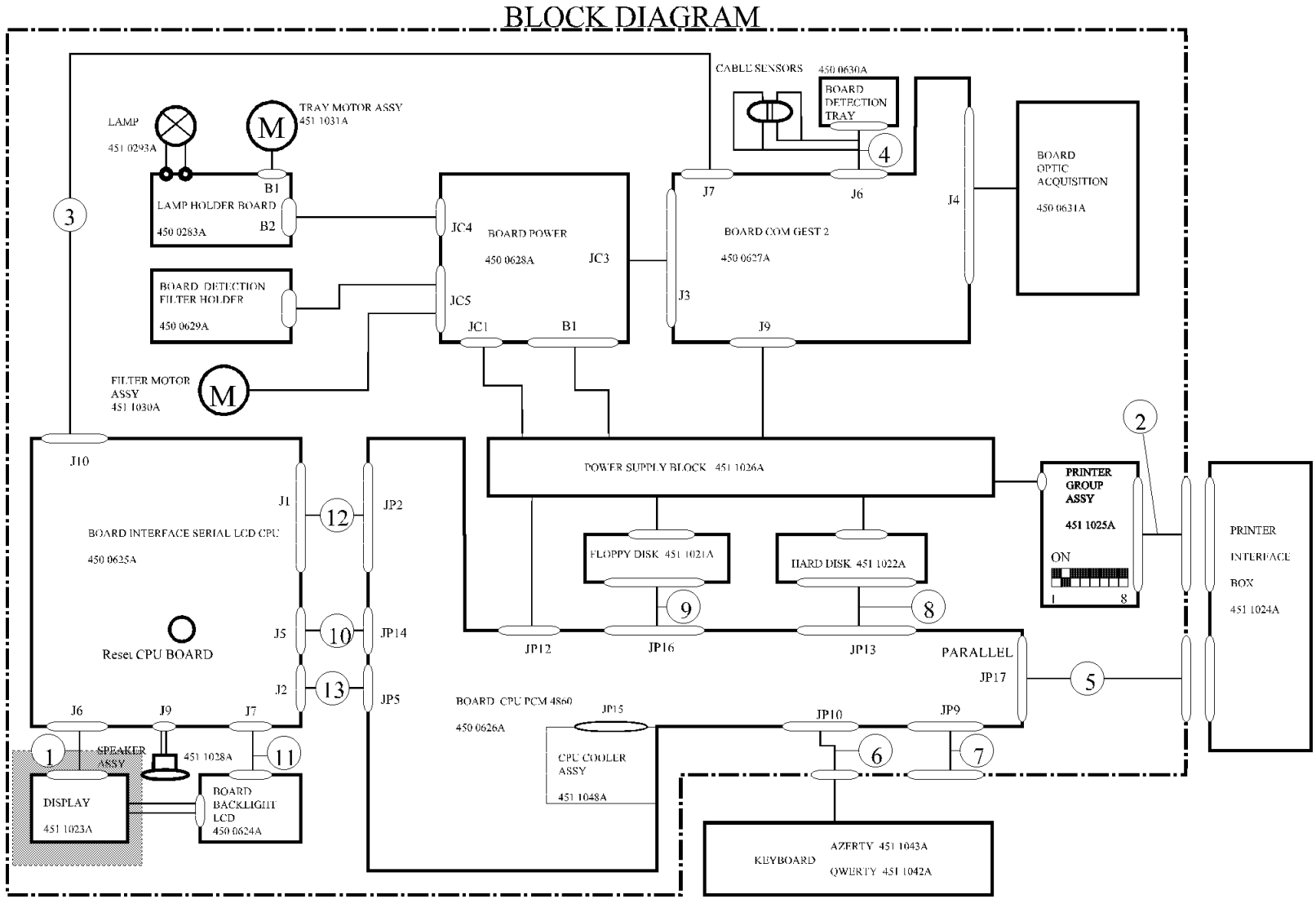


Figure 4-50 Display Cable Connections

Electrical Absolute Maximum Ratings

Vss =0V : Standard

ITEM	SYMBOL	MIN.	MAX.	UNIT	COMMENT
Power supply for logic	VDD-VSS	0	6.5	V	
Power supply for LC Drive	VDD-VEE	0	27.5	V	
Input Voltage	Vi	-0.3	VDD+0.3	V	Note 1
Input Current	Ii	0	I	A	
Static Electricity	-	-	-	-	Note 2

NOTE 1 : DISP.OFF. FRAME. LOAD. CP. UDO _ UD3. LDO _ LD3.
NOTE 2 : Make certain you are grounded when handling LCM.

Environmental Absolute Maximum Ratings

ITEM	OPERATING		STORAGE		COMMENT
	MIN	MAX	MIN	MAX	
Ambient temperature	0°C Note 6	45°C Note 7	-25°C	60°C	Note 2, 3.
Humidity	Note 1		Note 2		Without condensation
Vibration	-	9.8 m/s^2 (1.0G)	-	11.776m/s^2 (1.2G) Note 5	Note 4
Shock	-	490 m/s^2 (50G) Note 5	-	490 m/s^2 (50G) Note 5	3 times for each direction of ±X/±Y/±Z pulse width 10ms.
Corrosive Gas	**Not Acceptable**		**Not Acceptable**		

NOTE 1 : Ta < 40°C : 85% RH max.
Ta > 40°C : Absolute humidity must be lower than the humidity of 85%RH at 40°C.
NOTE 2 : Ta at -25°C -------<48h. at 60°C ------<168h.
NOTE 3 : Background colour changes slightly depending on ambient temperature.
This phenomenon is reversible.
NOTE 4 : 5Hz _ 500Hz (except resonance frequency) for each direction of X/Y/Z.
Any failure caused by connector loosened while testing will be ignored.
NOTE 5 : This module should be operated normally after the test has been finished.
NOTE 6 : Higher starting voltage of CFL and higher LCD driving voltage are needed when operating at 0°C.
The life span of CFL will be reduced when operating at 0°C.
You need to check the value of IL and the characteristics of the inverter
The response time at 0°C will be slower.
NOTE 7 : There is a possibility that the colour will not be uniform when operating at 45°C.

Electrical Characteristics of Backlight

ITEM	MIN.	TYP.	MAX.	UNIT	NOTE
Lamp Voltage	-	360	-	V	Ta=25°C
Frequency	30	70	85	kHz	Ta=25°C
Lamp Current	2.5	5	5.5	mA	Ta=25°C
Starting Discharge Voltage	1000	-	1500	V	Ta=25°C

Precautions for Use

- It is essential to drive LCDs within the specified voltage limit since driving at a higher voltage will reduce life span. An electrochemical reaction due to direct current deteriorates the LCDs. You should therefore avoid using a direct current driver.
- Response time will be delayed if the temperature is lower than the recommended operating temperature range. However, at a higher temperature the LCDs show a dark blue colour. This phenomenon does not mean that the LCDs are out of service and they will come back to normal in the specified operating temperature range.
- If the display area is pushed hard during operation certain characters will be displayed but this can be remedied by turning the instrument off and on again once.
- A slight deposit of dew on terminals can cause an electrochemical reaction resulting in a terminal open circuit. Usage under the relative condition of 40°C 50%RH or less is necessary.

Storage

- If the instrument is to be stored for a long period of time (i.e. several years) the following precautions should be taken.
- Store it in a polyethylene bag with the opening sealed to avoid air entering the bag. Do not insert a dessicant.
- Place it in a dark room where it is not exposed to direct sunlight or artificial light. The temperature should be between 0°C and 35°C.

Safety

- It is recommended to break damaged or unnecessary LCDs into pieces and clean off the liquid crystal using a solvent such as acetone or ethanol.
- Should your hands come in contact with any liquid that has leaked from damaged glass, wash them well with soap and water.

SECTION 4.8 PRINTER BLOCK

SECTION CONTENTS

This section includes:

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PART FUNCTIONAL DESCRIPTION	4-121
GENERAL SPECIFICATIONS	4-122
CONNECTORS AND SIGNALS	4-124
SETTING OF DIP SWITCHES	4-126
• *mini API* Printer Setting	4-127
PRINTER INTERFACE BOX (451 1024A)	4-128
CABLE CONNECTIONS	4-129

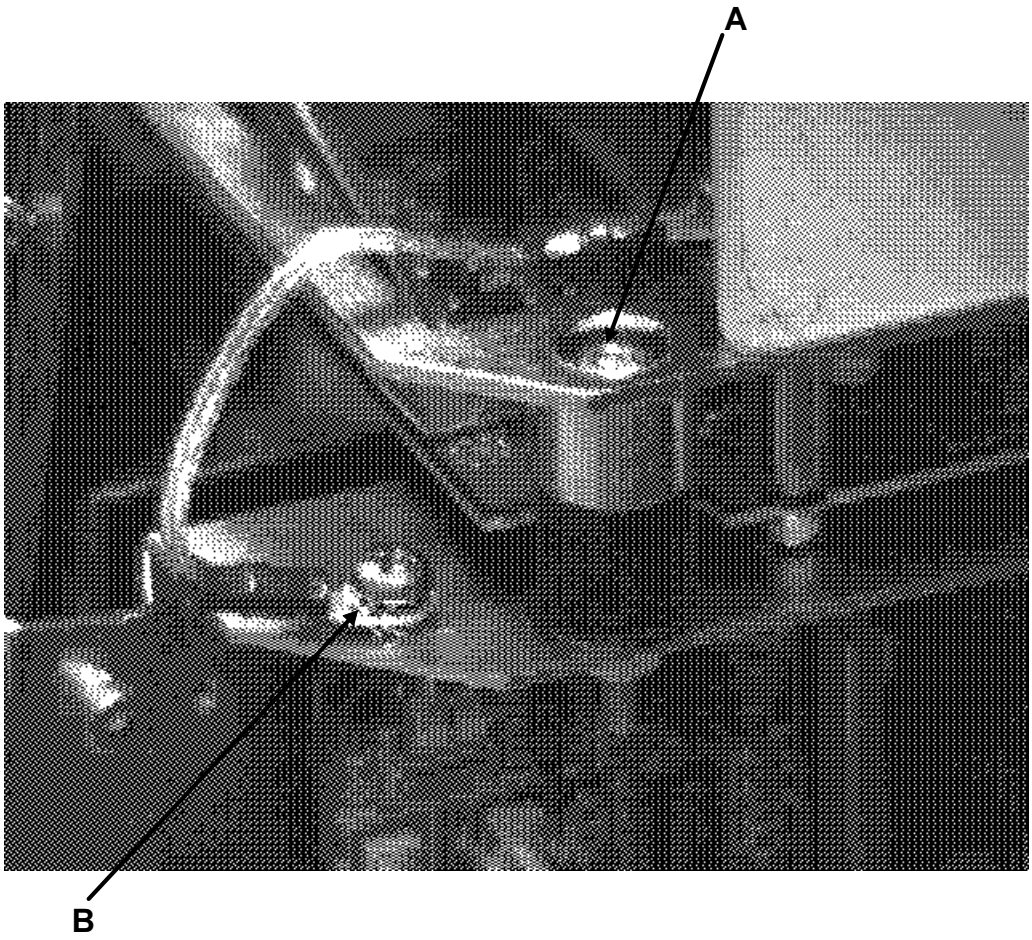


Figure 4-51 Printer

OUTLINE

The DP8340 series of serial dot matrix printers is for use in ECR, POS, electronic instruments, banking machines and computer peripheral equipment.

The DP8340 series include the following features:

1) 2-colour printing (Red and Black).
2) High-speed bidirectional printing (2 line/sec, 40 columns per line).
3) 9-pin print head.
4) Parallel interface (Centronics compatible).
5) Commands for expanded characters, inverted characters, emphasised characters, and red and black printing are provided, which makes the printer very versatile.
6) Simultaneous Data Communication and Printing.
7) 2 Peripheral Drivers.

Removing the Printer

- Remove the casing (page 4-21).
- Remove the 3 M4x12 CHC screws (A)
- Remove the 2 ground wires (B).
- If you adjust the board COM GEST2, put the printer on top of the power supply block.
- Disconnect the 2 cables from the rear of the printer.
- Remove the printer.

PART FUNCTIONAL DESCRIPTION

ON LINE Lamp	Lights up (green LED) when the unit is in the on-line mode.
ALARM Lamp	Lights up (red LED) when printer operation is not normal, or the printer is out of paper. It is necessary to install paper in the printer and press the ON LINE button to recover from paper empty status. Reset the printer to recover from abnormal operation.
ON LINE Button	Toggles between the on-line and off-line modes. The printer will go on-line after turning power on.
FEED Button	Momentary operation of this button provides one line feed. Pressing this button continuously will cause continuous paper feed. If power is turned on while pressing this button, self printing[1] will be performed.
Interface Connector	Connects the printer to host computers. Check that both computer and printer are off before connecting.
DIP Switches	Allows for setting of various functions according to user requirements.
Printer Reset Button	Located on the printer interface box at the rear of ***mini API***.

1.Self printing.
This printer has another convenient function, the Automtic Test Printing. With the ink ribbon and paper properly installed in the printer, turn the power ON while holding down the Feed switch. Test printing will start and stop again automatically.

GENERAL SPECIFICATIONS

Printing Method	Serial impact dot matrix printing 9 wires	
Number of print columns	40 columns, 12 CPI	
Print speed	Approx. 2 lines/sec	
Print direction	Bi-directional	
Line spacing	1/6 inch	
Paper feed method	Friction Feed or Sprocket-feed	
Paper feed speed	Approx. 12 lines./sec	
Character set	ASCII	96
	Special	64
	Block graphics*	64
	Katakana (Japanese)	64
	IBM Special	83
	IBM Block graphics*	50
	Download	10
Font configuration	Ordinary characters	5 x 9 dots
	Block graphics*	6 x 6 dots (6 x 8 dots)
Character size	2.42(H) x 1.71(W)mm	
Dot spacing	0.35(H) x 0.35(W)mm	
Print area	84.3mm	
Print buffer	Approx. 1.5KB	
Interface	Parallel Interface (Centronics compatible)	
Peripheral drive	2 outputs (each 1A max. at 12V. Both cannot operate at the same time).	
Paper specification		
Paper type	Ordinary and carbonless copy paper	
Size Paper width	114.3mm (4.5 inches)	
Roll diameter	80mm outer diameter (Max)	

* Graphic feed not available

Ink ribbon specification	
Colour	Black and red/Black only
Ribbon material	Nylon (#40 denier)
Ribbon size	13mm x 6m
Spool	13mm (width), 35mm in diameter (two spools)
Head life	70 million characters
Printer reliability	5 million lines MCBF (except head life)

bioMérieux Paper Product Number: 99720

BioMérieux Ink Ribbon Product Number: 99721

CONNECTORS AND SIGNALS

Pin No.	Signal Name	IN/OUT	Function
1	$\overline{\text{STROBE}}$	IN	Signals when data is ready to be read. Signal goes from HIGH to LOW (for at least 0.5 microsec.) when data is available.
2-9	DATA1-8	IN	These signals provide the information of the first to eight bits of parallel data. Each signal is at HIGH level for a logical 1 and at a LOW level for a logical 0.
10	$\overline{\text{ACK}}$	OUT	A 9 microsecond LOW pulse acknowledges receipt of data.
11	BUSY	OUT	When this signal goes LOW, the printer is ready to accept data. When the printer is in one of the conditions below "HIGH" is set. 1. Data being entered. 2. Off line. 3. Error condition.
12	PAPER OUT	OUT	This signal is normally LOW. It will go HIGH if the printer runs out of paper.
13	SELECTED	OUT	This signal is HIGH when the printer is on-line.
14-15	N/C		Unused.
16	SIGNAL GND		Signal ground.
17	CHASSIS GND		Chassis ground, isolated from logic ground.
18	N/C		Unused.
19-30	GND		Twisted pair return signal ground level.
31	$\overline{\text{RESET}}$	IN	When this signal goes LOW, the printer is reset to its power-on condition.
32	$\overline{\text{ERROR}}$	OUT	This signal is normally HIGH. This signal goes LOW to indicate that the printer cannot print due to an error condition.
33	EXT GND		External ground.
34-36	N/C		Unused.

This connector mates with an Amphenol 57-30360 connector.

Other parameters may be determined by the user.

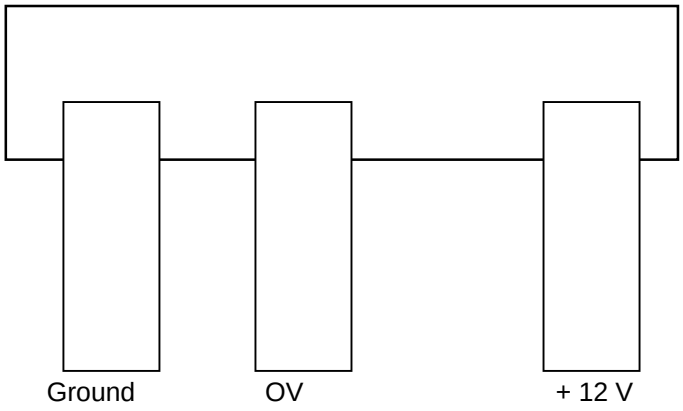


Figure 4-52 Power Supply Connector

SETTING OF DIP SWITCHES

Switch	Function	ON	OFF
1, 2	**Character Table (see below)**		
3	Control cord CR	Disable	Enable
4 [*1]	Printing Direction (Red printing)	Bi.	Uni.
5 [*2]	Ink Ribbon	2-colour	monochrome
6, 7, 8	**International Character Set (see below)**		

[*1] DIP Switch 4 should be set to OFF when you use 2-part sprocket paper with the seam on the right since the ribbon snags at the seam if shifted.
The DIP Switch 4 should be otherwise set to ON.

[*2] DIP Switch 5 should be set to ON when you use a 2-colour ribbon for 2-colour printing.
It should be set to OFF when a monochrome ribbon is used.

SW NO.	USA & Europe	IBM #1	IBM #2	JAPAN
1	ON	OFF	ON	OFF
2	ON	ON	OFF	OFF

Character Table

SW No.	USA	France	Germany	England	Denmark	Sweden	Italy	Spain
1	ON	OFF	ON	OFF	ON	OFF	ON	OFF
2	ON	ON	OFF	OFF	ON	ON	OFF	OFF
3	ON	ON	ON	ON	OFF	OFF	OFF	OFF

International Character Set

NOTE : When DIP Switches 1 and 2 are set to OFF, the printer always selects the Japanese international character set regardless of the status of DIP Switches 6, 7 and 8.
When DIP Switches 1 and 2 are otherwise set, the printer selects the character set determined by DIP Switches 6, 7 and 8.
Each international character set is selectable through software regardless of the selection by DIP Switches.

mini API Printer Setting

The printer is equipped with 8 DIP Switches.

The setting should be as in Figure 4-53 below.

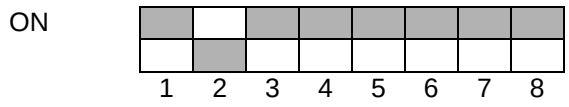


Figure 4-53 DIP Switch setting

PRINTER INTERFACE BOX (451 1024A)

This component has two main functions.

1) It redirects the printing signals transmitted by the board CPU to the integrated printer.
2) It includes a "Printer Reset" button that reinitialises the printer when pressed.

If a printer interface box is not installed, the printer will perform a self-test when ***mini API*** is turned on.

CABLE CONNECTIONS

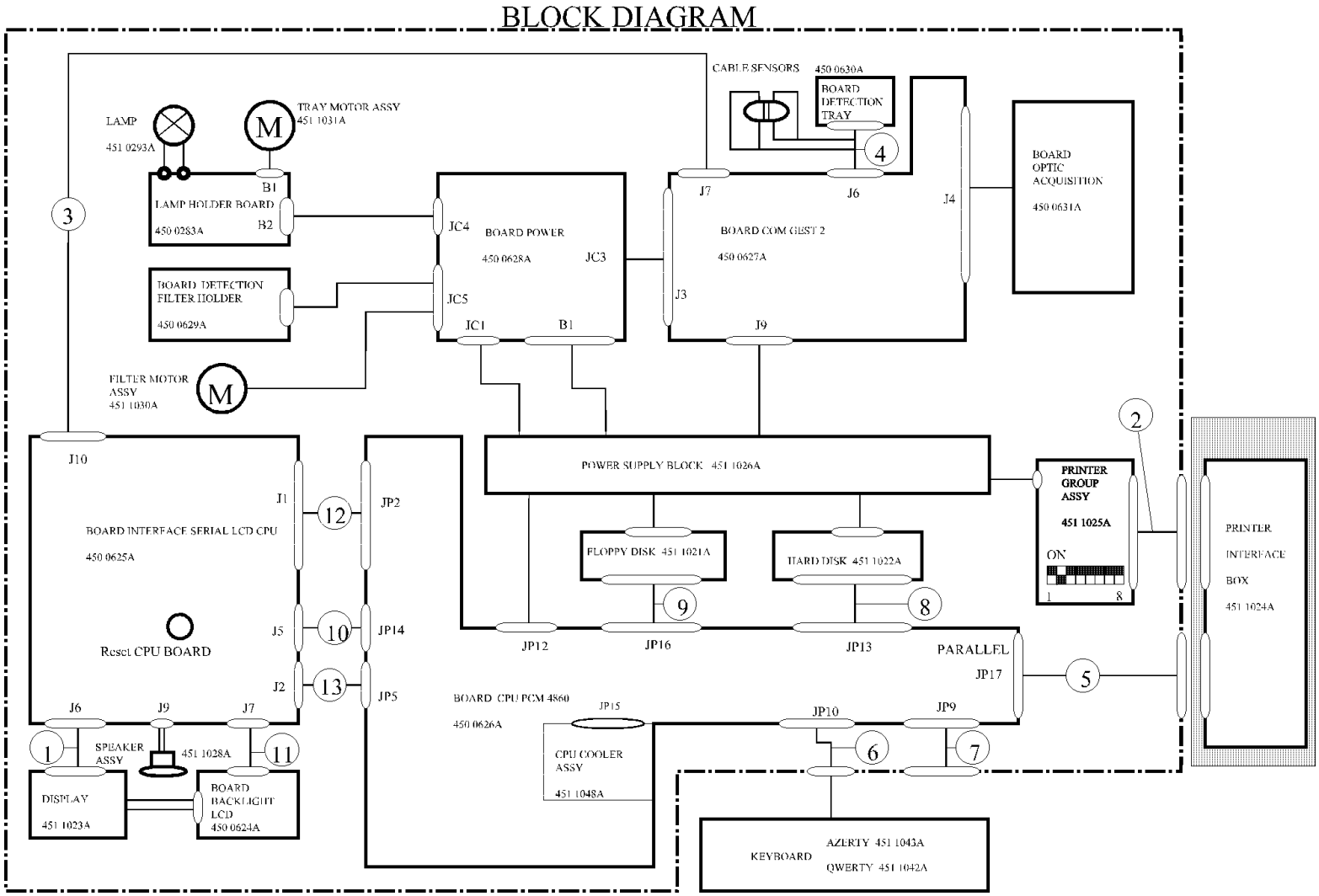
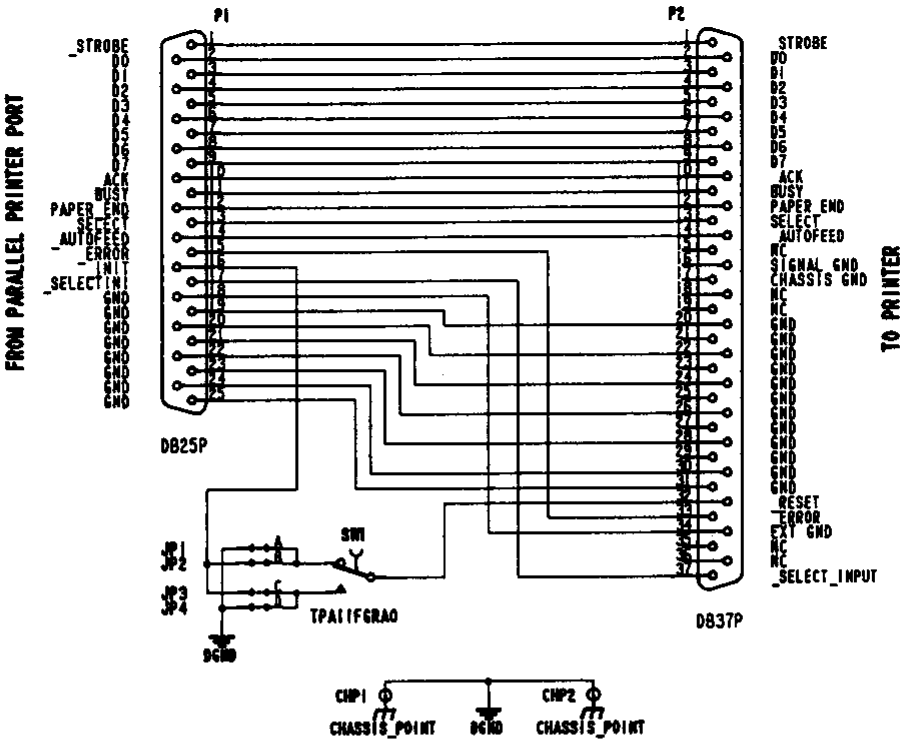


Figure 4-54 Printer Cable Connections



3. FOR SW1 = AUGAT TPA11FGRAO SET: B, D JUMPERS.
2. FOR SW1 = FUJISOKU AP1F-6S SET: A, C JUMPERS.
1. FOR ASSEMBLY SEE DOC. NO. NS8209-1.

NOTES :

DOCUMENTO A DIFFUSIONE NON CONTROLLATA

DATA	DESCRIZIONE MODIFICA	DISEGNATO	CONTROLLATO	REV.
18/7/96	ELIMINATO DESCRIZIONE DI P1 E P2: PREPARATO PER EMISSIONE	D. BARTOLOZZI	F. OZZOLA	B
30/05/96	VARIATO CARTIGLIO, AGGIUNTO SW1, JP1, JP2, JP3, JP4	D. BARTOLOZZI		A
06/03/96	PRIMA EDIZIONE DISEGNO	D. BARTOLOZZI		.

DISEGNATO: Daniele Bartolozzi — CONTROLLATO ED EMESSO: Fabrizio Ozzola — ULTIMA EDIZ.

bioMerieux Italia S.p.A.
Ponte a Ema FIRENZE

DENOMINAZIONE: PRINTER INTERFACE CIRCUIT

FORMATO: A4 — Dis.N. NS8109 — REV. B

TAVOLA 1 di 1

PROPRIETA' DELLA bioMerieux Italia S.p.A. SENZA AUTORIZZAZIONE SCRITTA DELLA STESSA IL PRESENTE DISEGNO NON POTRA' ESSERE COMUNQUE UTILIZZATO PER LA COSTRUZIONE DELL'OGGETTO RAPPRESENTATO NE' VENIRE COMUNICATO A TERZI O RIPRODOTTO.
LA SOCIETA' PROPRIETARIA TUTELA I PROPRI DIRITTI A NORMA DI LEGGE.
NON RILEVARE LE DIMENSIONI DALLA GRAFICA

Figure 4-55 Printer Interface Circuit

CHAPTER 5

PREVENTIVE MAINTENANCE

INTRODUCTION

This chapter covers the routine preventive maintenance that should be carried out on ***mini API***.

The following topics are presented in this chapter:

	Page
TESTING *MINI API*	5-4
PREVENTIVE MAINTENANCE	5-5
• Cleaning *mini API*	5-5
• Changing the Ribbon	5-11
• Changing the Roll of Paper	5-12
• Changing the Fuse	5-14
FIELD ENGINEER PREVENTIVE MAINTENANCE	5-15
• Reader Module	5-15

TESTING *MINI API*

mini API should be tested:

- When there is any doubt as to the precision of the instrument.
- When visual and automatic interpretation differ.

CAUTION ! ***The test should be performed by bioMérieux Field Service Personnel.***

PREVENTIVE MAINTENANCE

Cleaning *mini API*

CAUTION ! ***Never use corrosive products to clean the surface of the mini API and the screen as these chemical products could damage the components.***

To remove dust that collects on the screen:

- Wipe it gently with a soft dry cloth. If this is not sufficient, use a product specially recommended for plastic casings.

To clean the disk drive:

- Use the cleaning kit for 3½" floppy disks (available from bioMérieux under spare parts product no. 4550122A).

To clean the printer:

- Use a soft brush to remove any dust.

The printer should be cleaned several times a year to ensure proper functioning (recommended frequency: monthly).

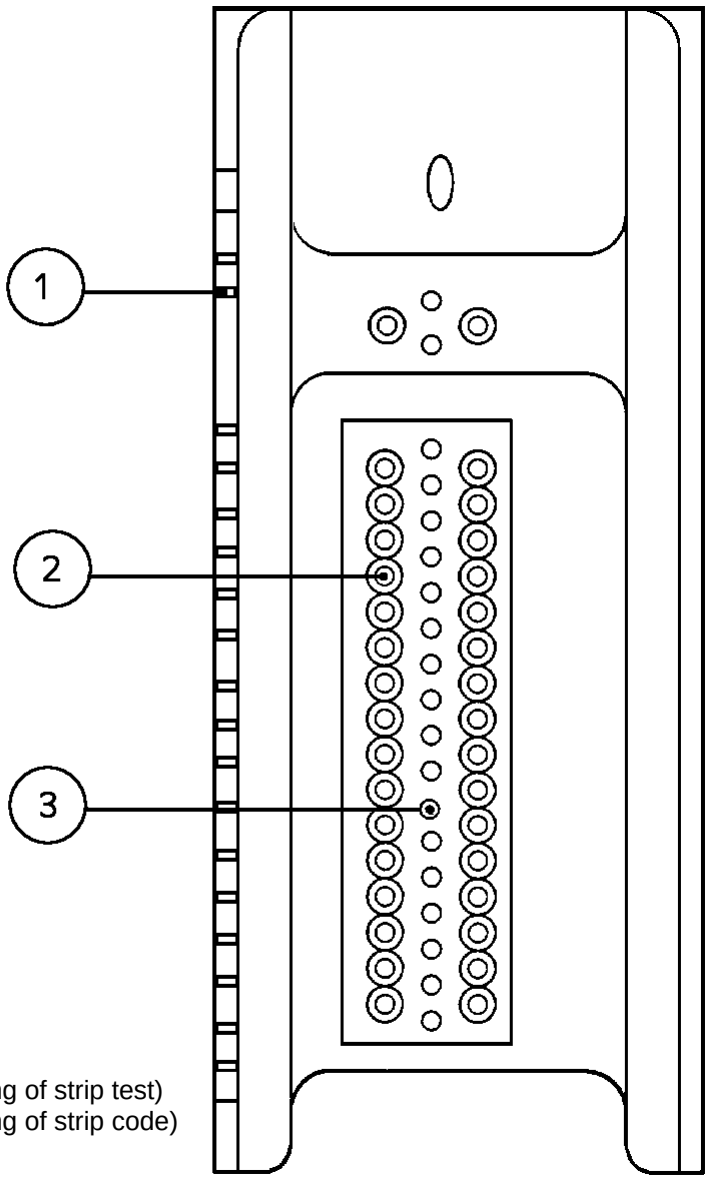
CAUTION ! ***Never use alcohol or solvents to clean the printer as these chemical products could damage components.***

Make sure no water gets inside the printing mechanism or on the electronic components.

Do not use a hard brush or abrasive materials.

Do not spray lubricants inside the printer.

Do not use compressed air to clean inside the printer.



1-Notch
2-Hole (reading of strip test)
3-Hole (reading of strip code)

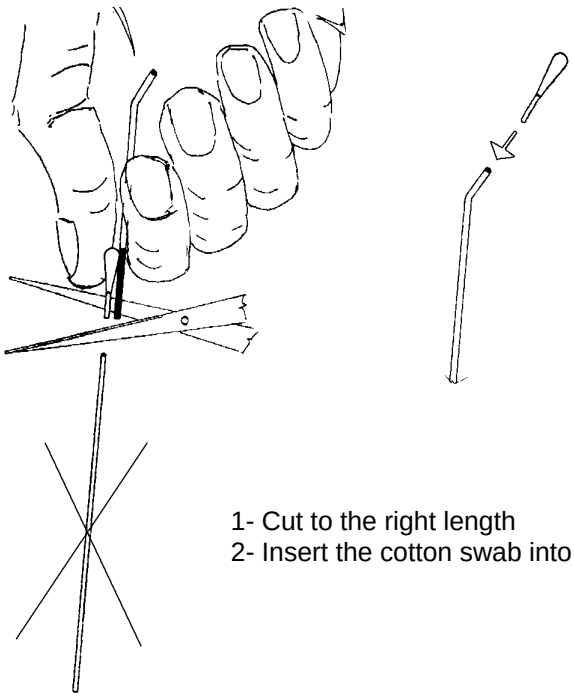
Figure 5-1 Strip Tray

To clean the strip tray:

- Remove the strip tray.
- Clean the tray holes using a cotton swab dampened with alcohol.
- Remove any dust from the notches on the left-hand side of the strip tray.
- Put the strip tray back into place.

The strip tray should be cleaned regularly to ensure optimum reading of the tests and recognition of the strip code.

IMPORTANT ! ***The medium in the ampoules should be considered as potentially infectious and be manipulated appropriately. Qualified laboratory personnel should take usual precautions necessary for infectious agents.***



1- Cut to the right length
2- Insert the cotton swab into the tool Strip Tray

Figure 5-2 Preparing the Photodiode Cleaning Tool

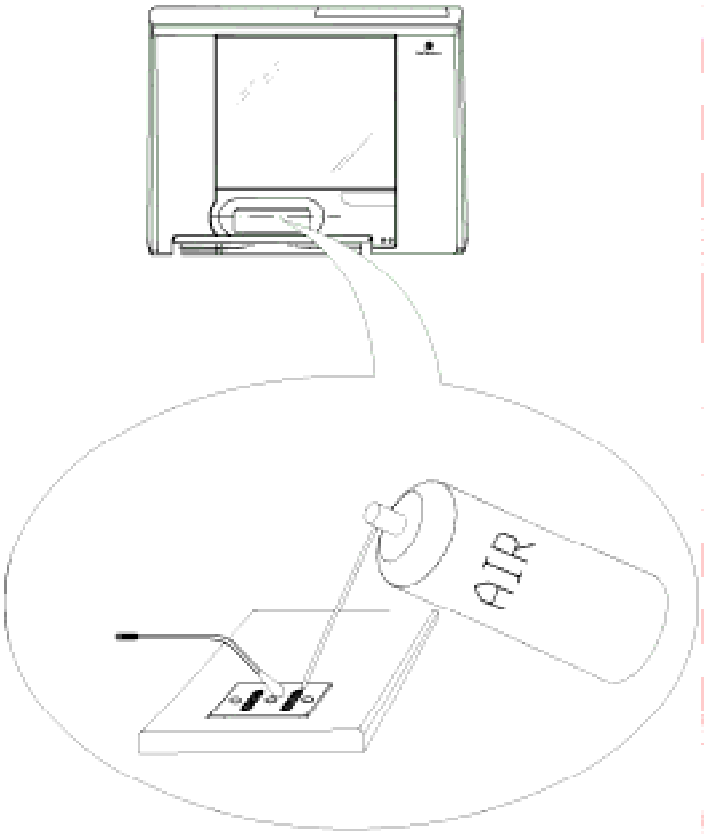


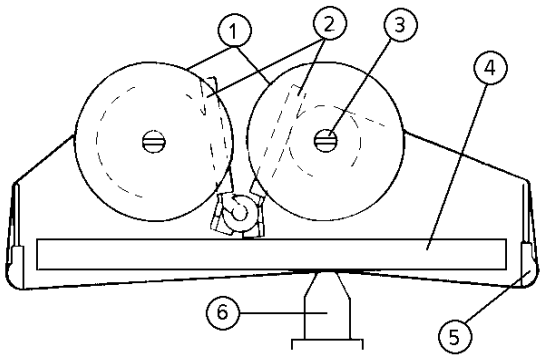
Figure 5-3 Cleaning the Photodiodes

To clean the photodiodes:

- Remove the strip tray.
- Prepare the cleaning tool (see Figure 5-2).
- Dampen it with 90° alcohol.
- Clean the diodes on the lower part between the two striking rollers (see Figure 5-3).
- Leave to dry in the open air and/or dry the photodiodes using compressed air in an aerosol (RCII-type or equivalent - neutral dry gas).
- Put the strip tray back into place.

NOTE : This tool is available from bioMérieux under Product no. 455 0409A.

1- Spools



2- Detection lever
3- Fixing Pin
4- Platen
5- Ribbon guide
6- Printing head
7- Driver pin

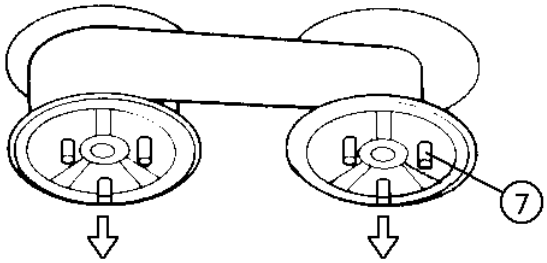


Figure 5-4 Changing the Ribbon and the Roll of Paper

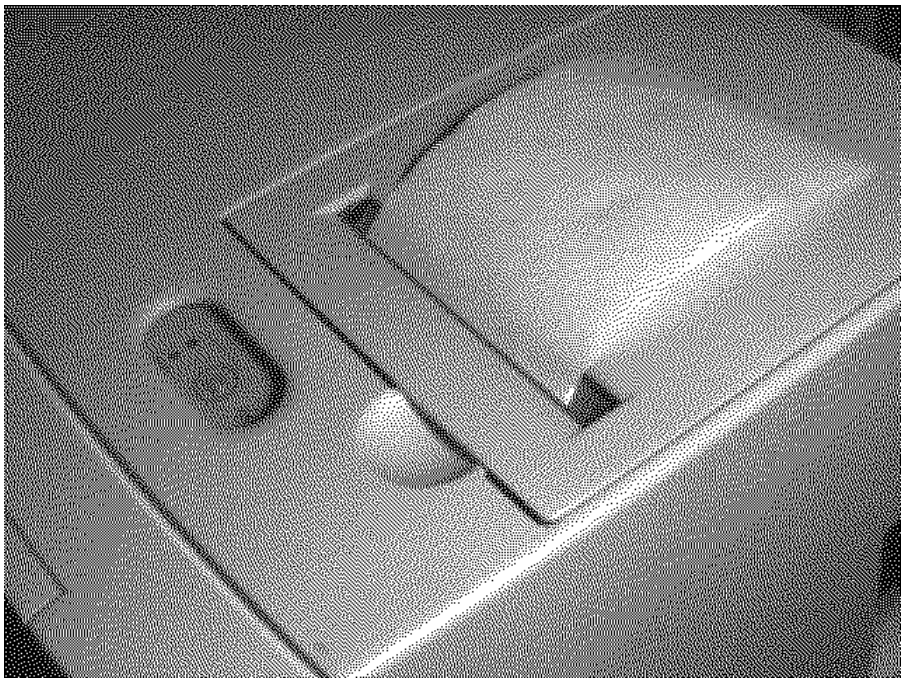


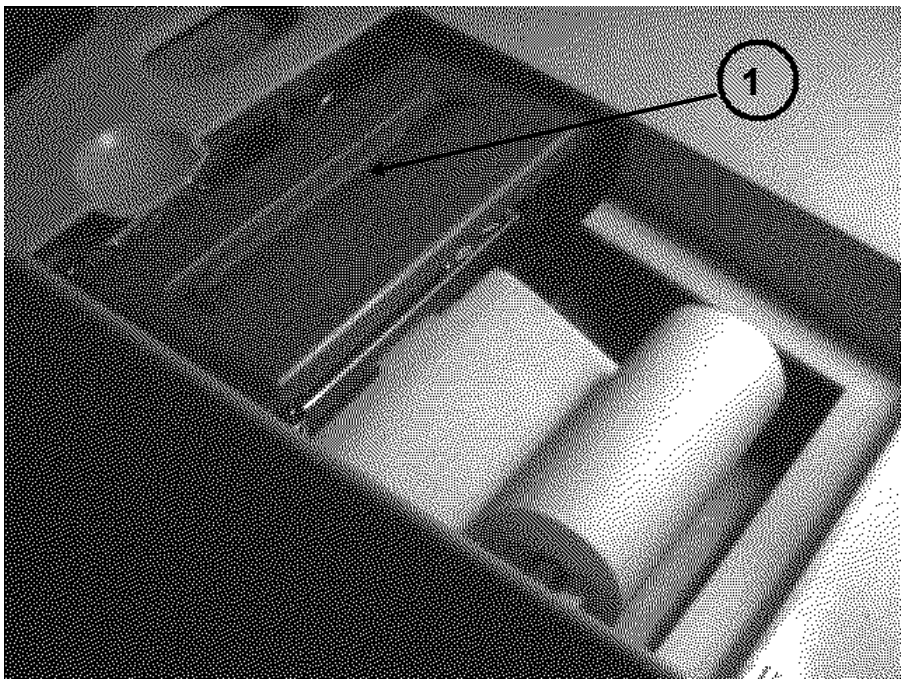
Figure 5-5 Printer Cover

Changing the Ribbon

There should not be any paper in the printer when you perform this operation.

- Remove the printer cover.
- Lift up the paper cutter.

NOTE : the ribbon is wound round two plastic spools.



1-Paper cutter

Figure 5-6 Paper Cutter

★ To remove the old ribbon:

- Release the detection lever on the left-hand spool and pull the spool upwards.
- Proceed in the same way for the right-hand spool.

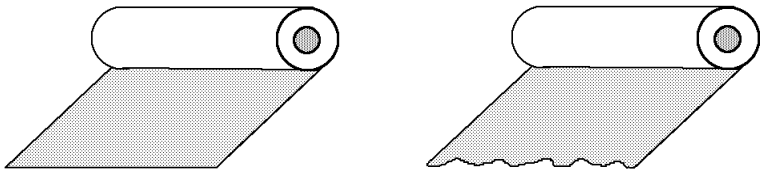
★ To put the new ribbon into place:

- Unwind a few centimetres of ribbon (the driver pins must be pointing downwards).
- Insert the left-hand spool by releasing the detection lever.
- Make sure the ribbon is correctly fitted before inserting the right-hand spool.
- Insert the right-hand spool by releasing the detection lever.
- Retighten the ribbon by turning the left-hand spool clockwise until the right-hand spool starts to turn.
- Put the paper into place.

NOTE : The life span of a ribbon is approx. 800,000 characters.

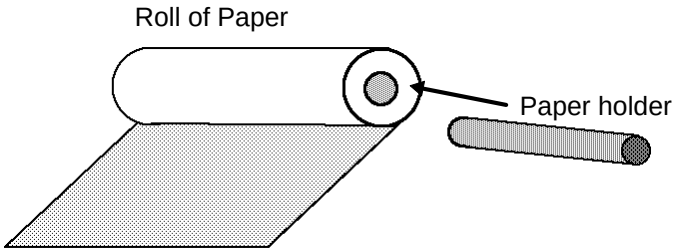
Changing the Roll of Paper

- Open the printer cover.
- Remove the rest of the old roll of paper.
- Pepare the new roll of paper.
- The edge of the paper must be cut cleanly.

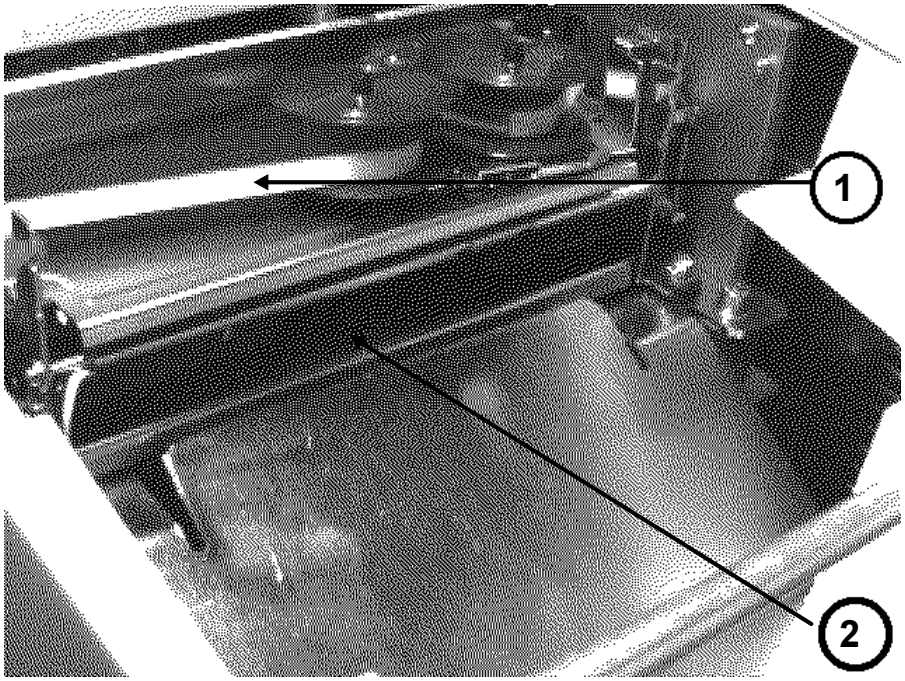


Correct Incorrect

- Place the paper holder inside the roll of paper.



- Position them inside the printer.
- Make sure the paper follows the correct path; it should unroll from underneath.



1-Ribbon
2-Inserting the paper

Figure 5-7 Loading the paper

– Hold the paper down flat and slide it into the printer.

★ At the same time,

– Press **<Feed>.**

The paper will now be fed through by the printer.

– Lower the printer cover.

– Press **<Feed>** until the paper comes out.

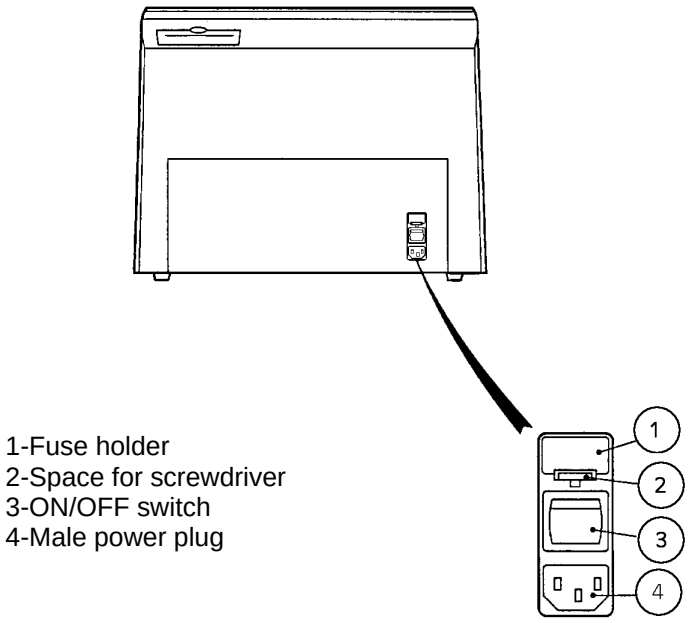


Figure 5-8 Back Panel of *mini API*

Changing the Fuse

- Switch off the ***mini API***.
- Disconnect the power plug.
- Open the fuse holder located above the power switch (insert a screwdriver in the space above the power switch).
- Replace the faulty fuses with new ones of the specified type (page 2-12).

DANGER ! ***Disconnect the instruments prior to any adjustment, replacement, servicing or repair during which the instruments have to be opened.***

FIELD ENGINEER PREVENTIVE MAINTENANCE

Reader Module

Preliminary Procedures

- Make sure that all cables, wires and connectors are secure.
- Make sure that all the strip tray holes are clean.
- Check the external appearance of the reader to detect any damage.
- Check the fan cover.

Scheduled Procedures

Yearly Preventive Procedures

- Clean the strip carriage.
- Soak the strip carriage in mild soap and water. Rinse well.
- Disinfect the surface of the carriage with a cloth dampened with acohol.
- Leave to dry in the open air.
- Clean the photodiodes.
- Using the cleaning tool with a swab dampened with alcohol, carefully clean the photodiodes.

- Make sure that the voltage on the board power is +24V (see page 4-34).
- Make sure that the voltage on the Lamp Holder card is 11.5V (see page 4-34).

Colorimetric procedure

- Perform a colorimetric reading to check the reference values (see page 4-75).
- Check that the beam is correctly centred (see pages 4-52 and 4-56).
- Check the speed of the strip tray and the maximum position (see pages 4-36 and 4-58).
- Check the strip code (see page 4-54).
- Perform the colorimetric procedure (see page 4-73).

Nephelometric procedure

- Check the central offsets (see page 4-76).
- Check the lateral offsets (see page 4-79).
- Check the central gains (see page 4-76).
- Check the lateral gains (see page 4-81)
- Perform the nephelometric procedure (see page 4-81).

Procedures

WARNING ! ***The procedures described below are a summary of the full procedures in Chapter 4.***

To perform these procedures please refer to:

-Colorimetric procedure Page 4-73
-Nephelometric procedure Page 4-81.

Colorimetric Procedure

- Voltage V0 Adjustment (See Page 4-72)
- E2PROM Initialisation (See Page 4-73)
- Central Gain Colorimetric Adjustment (See Page 4-73)
- Tray Initialisation (See Page 4-74)
- Colorimetric Reading Validation (See Page 4-75)

NOTE : If the E2PROM initialisation is performed, the nephelometric procedure automatically has to be carried out.

Nephelometric Procedure

- Central Offsets Adjustment (See Page 4-76)
- Central Gain Nephelometric Adjustment (See Page 4-76)
- Nephelometric Reading Validation (See Page 4-77)
- Lateral Offsets Adjustment (See Page 4-79)
- Lateral Balancing Adjustment (See Page 4-79)
- Lateral Gain Nephelometric Adjustment (See Page 4-81).

CHAPTER 6

TROUBLESHOOTING GUIDE

INTRODUCTION

The following topics are presented in this chapter:

	Page
OVERVIEW	6-4
• Determining the Problem	6-4
• Solving the Problem	6-4
ERROR MESSAGE TROUBLESHOOTING	6-5
• Error Messages Appearing in the *mini API* Software	6-5
• Reference alarm	6-6
REPAIR BY UNIT REPLACEMENT	6-8
• Introduction	6-8
• Flow chart (1) Abnormal Operation at Power On	6-9
• Flow chart (2) Abnormal Strip Tray Operation	6-10
• Flow chart (3) Incorrect Data Sent to the Computer	6-11

OVERVIEW

This chapter contains detailed information to help you resolve problems with the system. The troubleshooting is divided into three parts:

1- Overview

2- Error Messages

3- Flowcharts

Determining the Problem

The problem can be determined by systematically reviewing the major aspects of most instrument problems:

Indicators
Frequency
Recent changes in the laboratory

Solving the Problem

Once you have determined the problem, solving it usually involves one or more of the following actions:

Alignment of a mechanical component.
Replacement of a mechanical compontent.
Adjustment.
Performing routine maintenance operations.

ERROR MESSAGE TROUBLESHOOTING

The ***mini API*** software has different error messages which are displayed when a problem occurs.

When the program detects an error during a reading it displays an error message on the screen. Some error messages are **major** others are **minor**.

The reader module has its own alarm which cannot be seen.

Error Messages Appearing in the *mini API* Software

The reading message contents enable the program to determine the validity of the answer by checking the reference value. To check if the offset values are correct, the program controls these values in the reader module (Message STX 2ETX).

Offset alarm

Minor error

Conditions
If the offset value > 30 and no cupule values outside the range, the following message appears:

Offset alarm
Have your reader serviced

- Clean the strip tray
- Clean the photodiodes (see page 5-9).

Major error

Conditions
If the offset value = 0 or offset value > 30 and one cupule value is outside the range, the following message appears:

Offset alarm
Reader out of service

- Clean the strip tray.Clean the photodiodes.
- If the problem persists, perform the condenser alignment (see page 4-52).

Reference alarm

Minor error

Conditions

If the reference value is between 221 and 254 and no cupule values are outside the range the following message appears:

Reference alarm
Have your reader serviced

- Clean the strip tray
- Clean the photodiodes (see page 5-9).

Major error

Conditions

If the reference value is between 0 and 70 and one cupule value is outside the range, then

If the reference value is between 221 and 254 and if one cupule value is outside the range the following message appears:

Reference alarm
Reader out of service

- Clean the strip tray
- Clean the photodiodes.
- If the problem persists, perform the condenser alignment (see page 4-52).

Reference alarm

Strip tray reference alarm

If one of the attenuation gains is at 0, the reader module activates the alarm.
To solve this problem perform the Colorimetric Adjustment.

Communication error

If the DSR signal is at its highest level, the reader module transmits data.
If the DSR signal is at its lowest level, the reader module stops transmitting and a test is run for 15 seconds on the DSR signal. The test loop stops after the 15 seconds.
Transmission stops and a communication alarm is triggered.

Motor alarm

If the DC motor does not run, the strip tray will not move and no slot will be detected on the optical interrupt. The motor alarm will automatically light up.This alarm may also appear if the strip tray is missing.

Maximum position alarm

Reminder: for each cupule, 56 dynamic measurements are performed on the central and lateral diodes. The starting and stopping signal for the 56 measurements is the information gathered on one of the optical interrupts of the detection tray as the strip carriage moves.

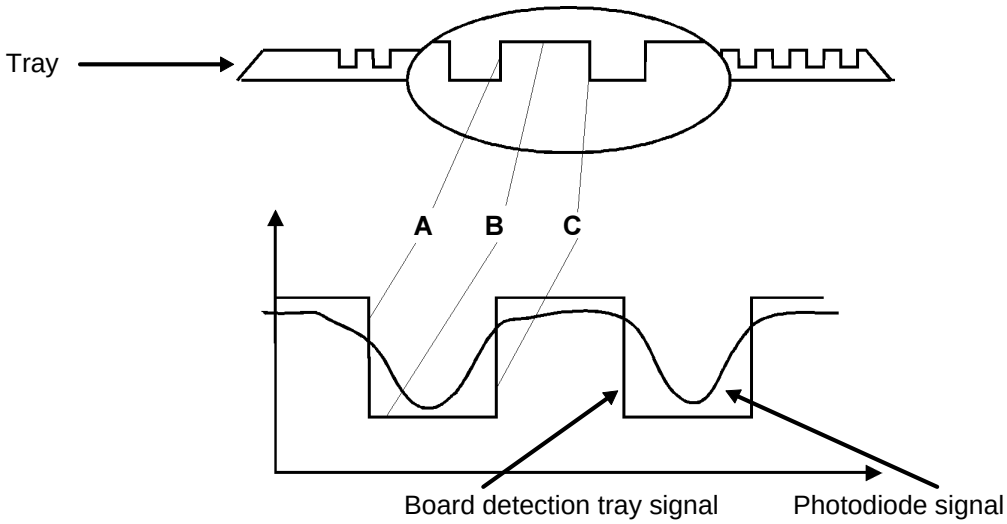


Figure 6-1 Back Panel of *mini API*

In theory, a maximum of light will be collected by the central photodiodes when the cupule is centred on the detection block.

In this position and mechanically, the tray hole will be located on point B of the optical interrupt card, which is exactly the middle of the cupule diameter.

Consequently, a properly adjusted optical block will have a maximum value measured for each cupule corresponding to the 28th acquisition.

Condition:
If the maximum position is between 18 and 36, the maximum position alarm lights up.

REPAIR BY UNIT REPLACEMENT

Introduction

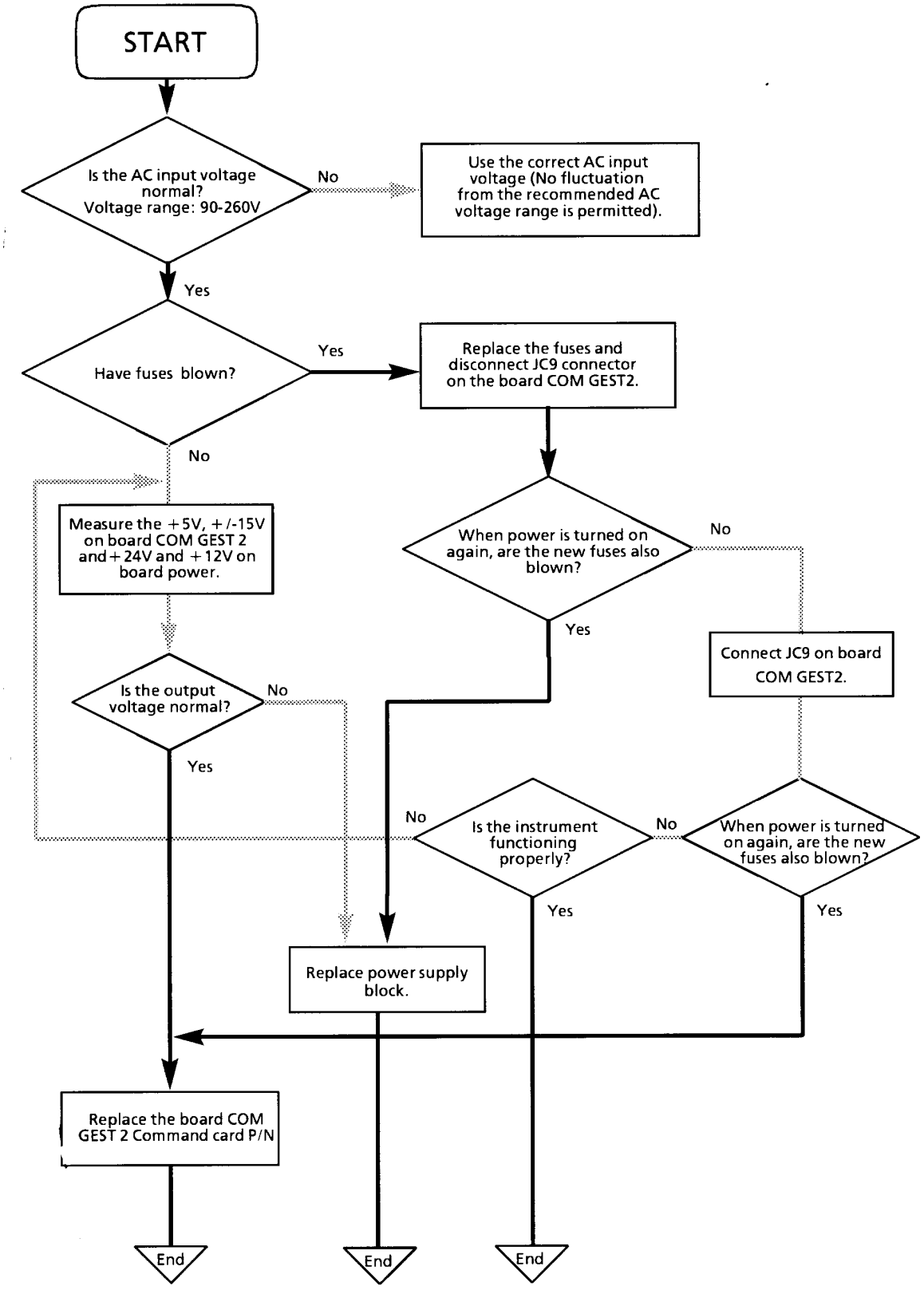
Most reader module problems can be corrected by replacing the defective unit.

First identify the problem from the symptoms you observe using the table below. Then follow the instructions in the corresponding flowchart to correct the problem.

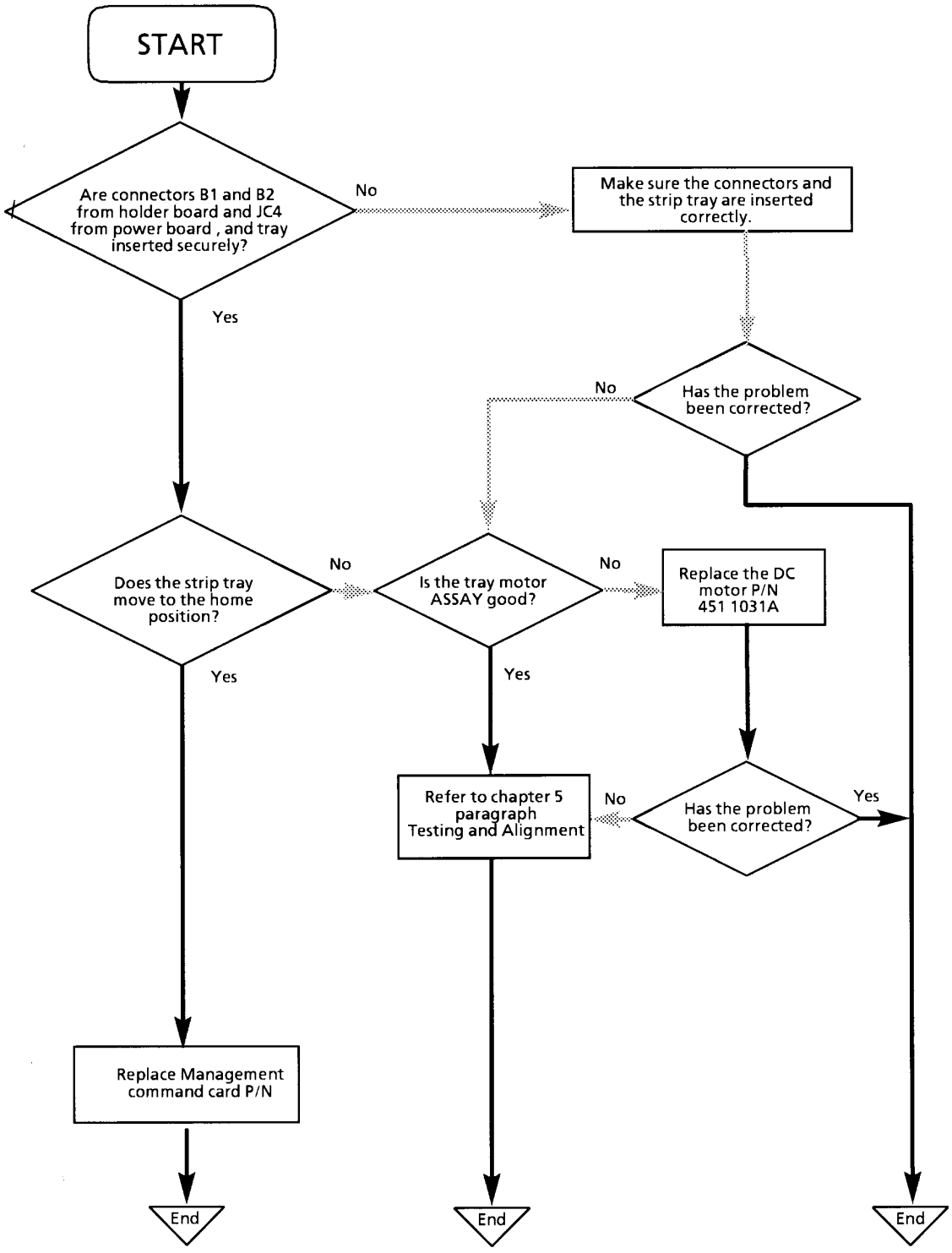
Symptom	Problem	Flowchart no.
Abnormal operation at power on.	-The strip tray does not move.	Chart (1)
Abnormal strip tray operation.	-The strip tray moves away from the home position at power on during initialisation. -The strip tray goes back and forth before reading.	Chart (2)
Incorrect data sent to the computer.	-The strip tray moves correctly and no alarm lights up during the reading cycle.	Chart (3)

Table G - Symptom and Flow Chart References

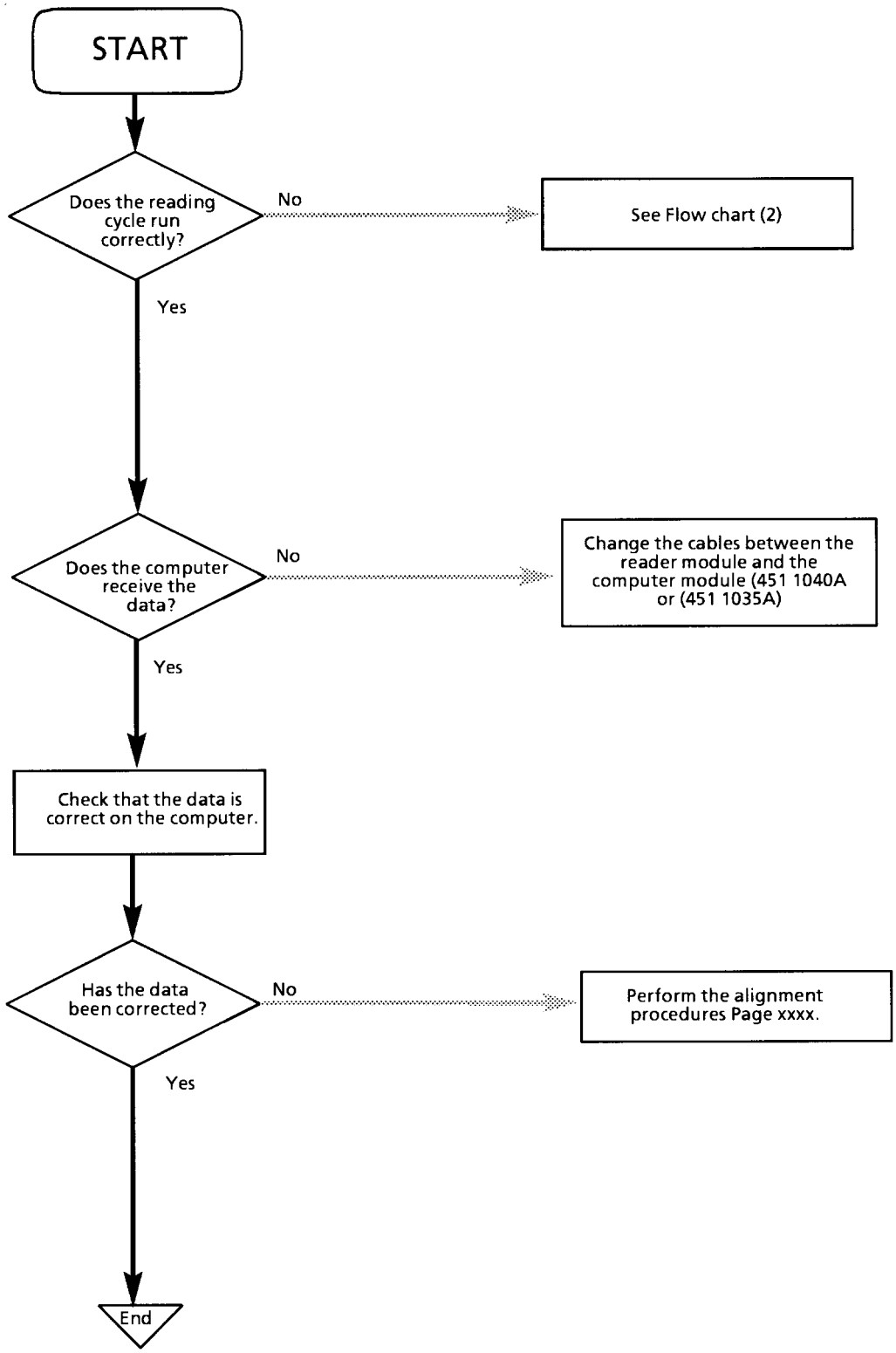
Flow chart (1) Abnormal Operation at Power On


START
Is the AC input voltage normal? Voltage range: 90-260V
No
Use the correct AC input voltage (No fluctuation from the recommended AC voltage range is permitted).
Yes
Have fuses blown?
Yes
Replace the fuses and disconnect JC9 connector on the board COM GEST2.
No
Measure the +5V, +/-15V on board COM GEST 2 and +24V and +12V on board power.
When power is turned on again, are the new fuses also blown?
No
Yes
Connect JC9 on board COM GEST2.
Is the output voltage normal?
No
Yes
No
Is the instrument functioning properly?
No
When power is turned on again, are the new fuses also blown?
Yes
Yes
Replace power supply block.
Replace the board COM GEST 2 Command card P/N
End
End
End

Flow chart (2) Abnormal Strip Tray Operation


START
Are connectors B1 and B2 from holder board and JC4 from power board , and tray inserted securely?
No
Make sure the connectors and the strip tray are inserted correctly.
Yes
No
Has the problem been corrected?
Does the strip tray move to the home position?
No
Is the tray motor ASSAY good?
No
Replace the DC motor P/N 451 1031A
Yes
Yes
Refer to chapter 5 paragraph Testing and Alignment
No
Has the problem been corrected?
Yes
Replace Management command card P/N
End
End
End

Flow chart (3) Incorrect Data Sent to the Computer


START
Does the reading cycle run correctly?
No
See Flow chart (2)
Yes
Does the computer receive the data?
No
Change the cables between the reader module and the computer module (451 1040A or (451 1035A)
Yes
Check that the data is correct on the computer.
Has the data been corrected?
No
Perform the alignment procedures Page xxxx.
Yes
End

CHAPTER 7

PREVIOUS INSTRUMENT

VERSION TABLE

PREVIOUS INSTRUMENT VERSION TABLE

Management of Versions

Instrument Version Numbers

The ***mini API*** versions are codes as follows:

Example: **M931111**

The **First Character** M indicates that an instrument is being used (M: Material, V: Software).

The Second Character gives information on the language being used

0 - Not used	
1 - English	QWERTY US
2 - German	QWERTY
3 - Italian	QWERTY
4 - Spanish	QWERTY
5 - Dutch	QWERTY
6 - Portuguese	QWERTY
7 - French	QWERTY
8 - Multilingual	QWERTY
9 - French/English	AZERTY
A - French	AZERTY
B - French/English	QWERTY
C - Multilingual	AZERTY
D - English	QWERTY UK
X - Unknown	

The Third Character indicates the mains voltage and the connector

0 - Not used	
1 - 220V / 50Hz	European plug
2 - 110V / 50Hz	European plug
3 - 90 to 240V / 50-60Hz	European plug
4 - 100V / 50Hz	European plug
5 - 220V / 60Hz	US plug
6 - 110V / 60Hz	US plug
7 - 90 to 240V / 50-60Hz	US plug
8 - 100V / 50Hz	Japanese plug
9 - 240V / 50Hz	UK plug
X - Unknown	

The Fourth Character indicates the mechanical components design

1 - Original version
2 - Sequential progression

The Fifth Character indicates the electronics version

1 - Original version
2 - Sequential progression

The Sixth Character gives the firmware version

1 - Original version
2 - Sequential progression

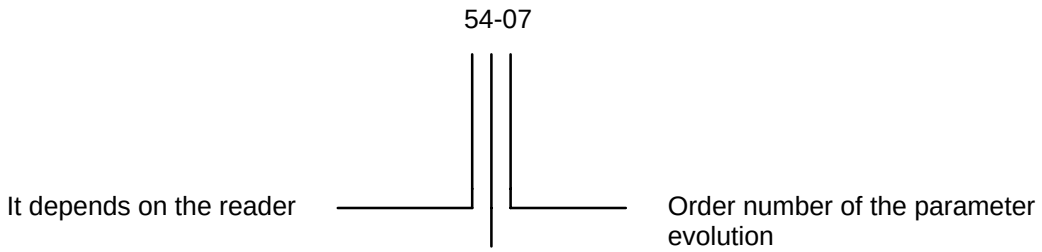
The Seventh Character gives information on the software

1 - Original version
2 - Sequential progression

EPROM Version Numbers

The EPROM versions are coded as follows.

Example:



CHAPTER 8

MODULE SPARE PARTS

INTRODUCTION

The following topics are presented in this chapter:

	Page
INTRODUCTION	8-3
HOW TO OBTAIN SPARE PARTS	8-4
• Coding Principle	8-4
• Placing Your Order	8-4
LIST OF TOOLS	8-4
ELECTRONIC BOARD	8-5
ELECTRICAL PARTS	8-6
MECHANICAL PARTS	8-7
CABLES	8-7

HOW TO OBTAIN SPARE PARTS

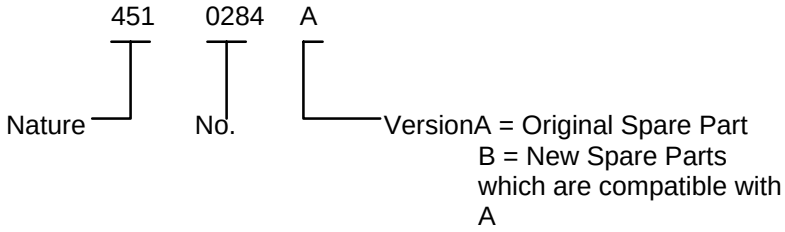
The list of spare parts contains the main elements of ***mini API***.

Spare parts have been mentioned all the way through this manual. They are available from bioMérieux S.A.

A price list is established every year. To obtain prices, please contact the "Assistance Technique Instrument" at bioMérieux S.A.

Coding Principle

The spare parts are coded as follows.



Placing Your Order

Place your order as follows.

Product Number	Description	Quantity
451 0293A	Lamp Holder Board	1

LIST OF TOOLS

Product No.	Description	Version	Comment
99 080	Nephelometric Adjustment Kit		
455 0128A	Colorimetric Adjustment Kit		
455 0149A	Special Spanner for filters		
455 0409A	Tool cleaner		

ELECTRONIC BOARD

Product No.	Description	Version	Comment
450 0626A	Board CPU PCM 4860		Refurbished
450 0627A	Board COM GEST2		Refurbished
450 0628A	Board Power		Refurbished
450 0631A	Board Optic Acquisition		Refurbished
450 0630A	Board Detection Tray		
450 0629A	Board Detection Filter Holder		
450 0283A	Lamp Holder Board		
450 0624A	Board Back Light LCD		Refurbished
450 0625A	Board Interface Serial LCD CPU		Refurbished

ELECTRICAL PARTS

Product No.	Description	Version	Comment
451 1026A	Power Supply Block		Refurbished
451 1025A	Printer Group ASSY		Refurbished
451 1024A	Printer Interface Box		
451 1023A	Display LCD LGM 5278 KVFC		Refurbished
451 1022A	Hard Disk Drive		Refurbished
451 1021A	Floppy Disk Drive		Refurbished
451 1028A	Speaker ASSY		
451 1048A	CPU Coller ASSY		
451 1042A	QWERTY Keyboard		
451 1043A	AZERTY Keyboard		
451 1032A	Firmware V54.07		
451 1030A	Filter Motor ASSY		Refurbished
451 1031A	Tray Motor ASSY		Refurbished
451 293A	Lamp		

MECHANICAL PARTS

Product No.	Description	Version	Comment
452 1040A	Casing ASSY		
452 1059A	Display Screw Kit		
452 1041A	Printer Silent Block		
452 0409A	Condenser		

CABLES

Product No.	Description	Version	Comment
451 1027A	Cable Sensors		4
451 1029A	Cable LCD Interface		1
451 1033A	Cable Back Light Interface		11
451 1034A	Cable PC Floppy Disk		9
451 1035A	Cable PC Interface		10
451 1036A	Cable PC Serial 2 Extension		7
451 1037A	Cable PC Keyboard		6
451 1038A	Cable PC Hard Disk		8
451 1039A	Cable PC Printer Interface Box		5
451 1040A	Cable Interface COM GEST2		3
451 1041A	Cable Printer PRN Interface Box		2
451 1051A	Cable Flat PC Interface		12
451 1052A	Cable PC Front Panel		13

CHAPTER 9

DIAGRAMS

INTRODUCTION

This chapter includes the following diagrams:

Board Detection Filter Holder 450 0629A

Board Detection Tray 450 0630A

Lamp Support Card 450 0283A

Board CPU PCM 4860 450 0626A

Set up 450 0626A

Board COM GEST 2 450 627A (1/5)

Board COM GEST 2 450 0627A (2/5)

Board COM GEST 2 450 0627A (3/5)

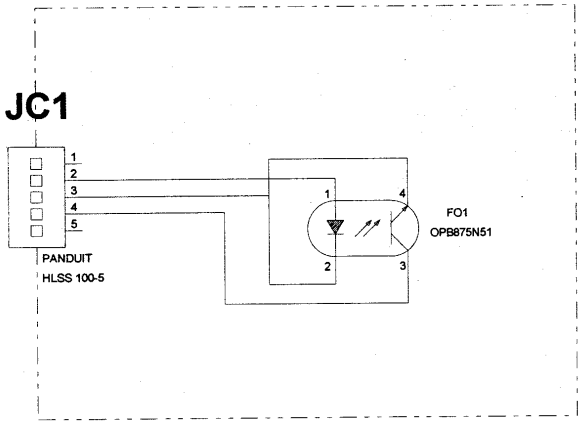
Board COM GEST 2 450 0627A (4/5)

Board COM GEST 2 450 0627A (5/5)

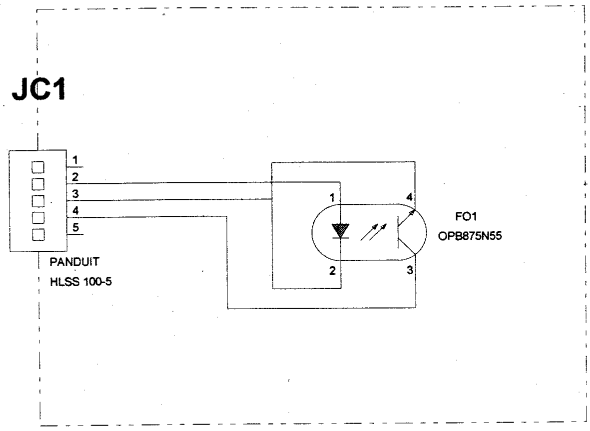
Board Optic Acquisition 450 0631A

Board Power 450 0628A

Board Interface LCD CPU 450 0625A



bioMerieux Italia S.p.A. Ponte a Ema FIRENZE	BOARD DETECTION FILTER HOLDER 450 0629A
	1 di 1



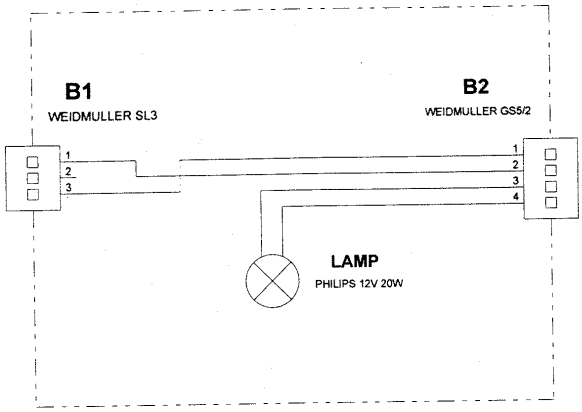
´bioMerieux Italia S.p.A.

Ponte a Ema FIRENZE

BOARD DETECTION TRAY

450 0630A

1 di 1



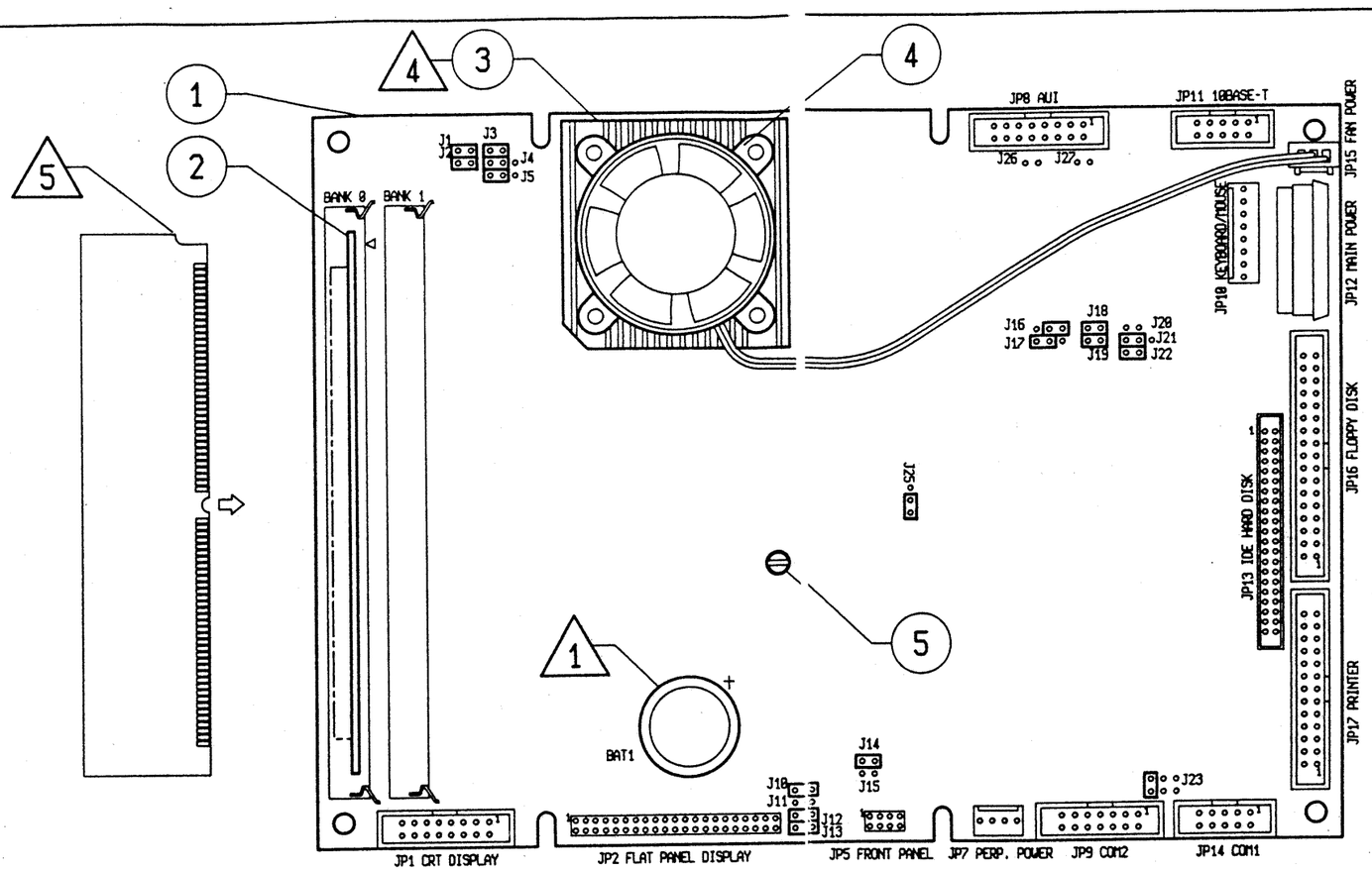
bioMerieux Italia S.p.A.

Ponte a Ema FIRENZE

LAMP SUPPORT CARD

450 0283A

1 di 1



bioMérieux Italia S.p.A.
UFF. DOCUMENTAZIONE
2 5 NOV. 1996

BOARD CPU PCM 4860

450 0626A

ROM ISA BIOS (214L2AK1)
STANDARD CMOS SETUP
AWARD SOFTWARE, INC.

* Date (mm:dd:yy) : __:__:__
* Time (hh:mm:ss) : __:__:__

	CYLS.	HEADS	PRECOMP	LANDZONE	SECTORS	MODE
** Drive C : SEE NOTE						
Drive D : None (0Mb)	0	0	0	0	0	-----

Drive A : 1.44M, 3.5 in.
Drive B : None

Video : EGA/VGA

Halt On : All Errors

Base Memory:	640K
Extended Memory:	0K
Other Memory:	384K
Total Memory:	1024K

ESC : Quit ↑ ↓ → : Select Item PU/PD/+/- : Modify
F1 : Help (Shift)F2 : Change Color

* INSERT DATE AND TIME CURRENT

** FOR HARD DISK FUJITSU M1614TAU SETS AS FOLLOWS:

	CYLS.	HEADS	PRECOMP	LANDZONE	SECTORS	MODE
Drive C : User (1089Mb)	528	64	0	838	63	LBA

FOR HARD DISK FUJITSU M1636TAU SETS AS FOLLOWS:

	CYLS.	HEADS	PRECOMP	LANDZONE	SECTORS	MODE
Drive C : User (1284)	622	64	0	2489	63	LBA

ROM ISA BIOS (214L2AK1)
CHIPSET FEATURES SETUP
AWARD SOFTWARE, INC.

Decoupled Refresh	: Disabled
Relocate 256k/384k	: Disabled
Memory Hole At 15Mb Addr.	: Disabled
DRAM Timing Control	: Normal
Fast DRAM	: Disabled
486 Streaming	: Enabled

Onboard FDC Controller	: Enabled
Onboard IDE Controller	: Enabled
Onboard Serial Port 1	: COM1(3F8h)
Onboard Serial Port 2	: COM2(2F8h)
COM3 & COM4 Address	: 3E8H,2E8H
Onboard Parallel Port	: 278H
Onboard Parallel Mode	: Printer
Solid State Disk	: Disabled

ESC : Quit ↑ ↓ → : Select Item
F1 : Help PU/PD/+/- : Modify
F5 : Old Values (Shift)F2 : Color
F6 : Load BIOS Defaults
F7 : Load Setup Defaults

VGA DISPLAY SOFTWARE CONFIGURATION:
SET FOR MONODD.BIN (AS PCM 4860 USER'S MANUAL - UTILITY DISK)

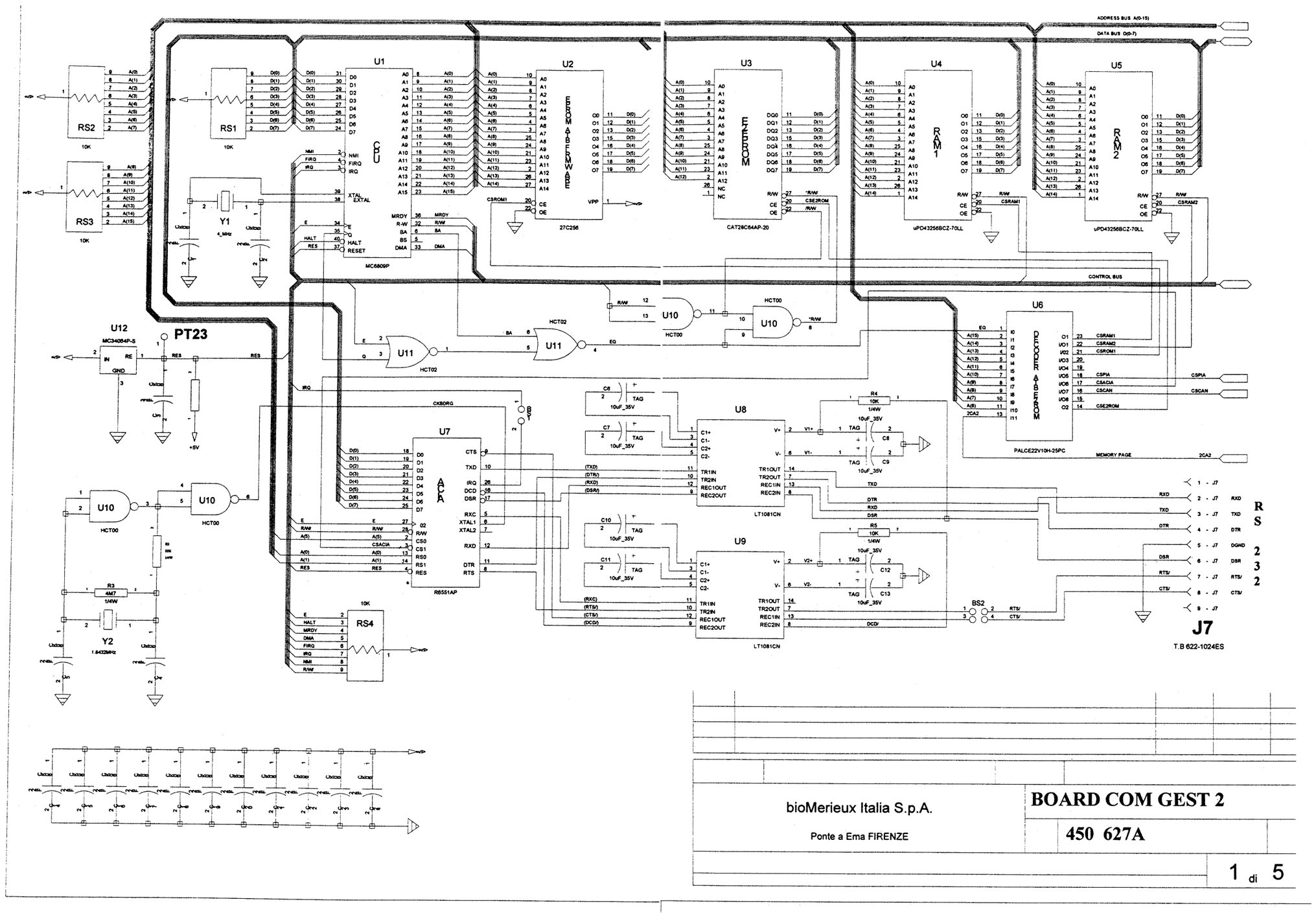
ROM ISA BIOS (214L2AK1)
BIOS FEATURES SETUP
AWARD SOFTWARE, INC.

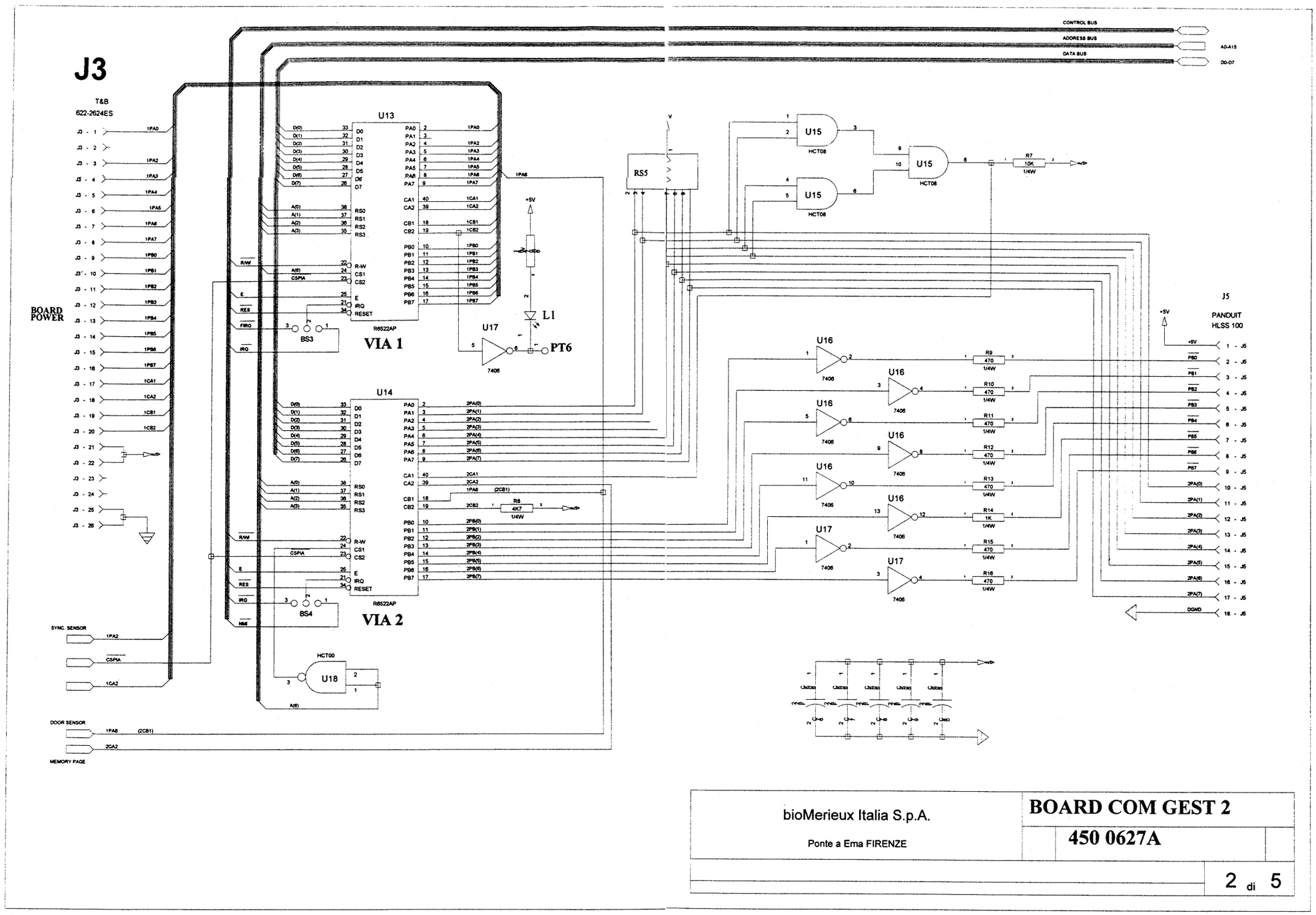
Virus Warning	: Disabled
CPU Internal Cache	: Enabled
Quick Power On Self Test	: Disabled
Boot Sequence	: A,C
Swap Floppy Drive	: Disabled
Boot Up Floppy Seek	: Enabled
Boot Up Numlock Status	: On
Boot Up System Speed	: High
IDE HDD Block Mode	: Disabled
Gate A20 Option	: Normal
Memory Parity Check	: Disabled
Typematic Rate Setting	: Disabled
Typematic Rate (Chars/Sec)	: 6
Typematic Delay (Msec)	: 250
Security Option	: Setup

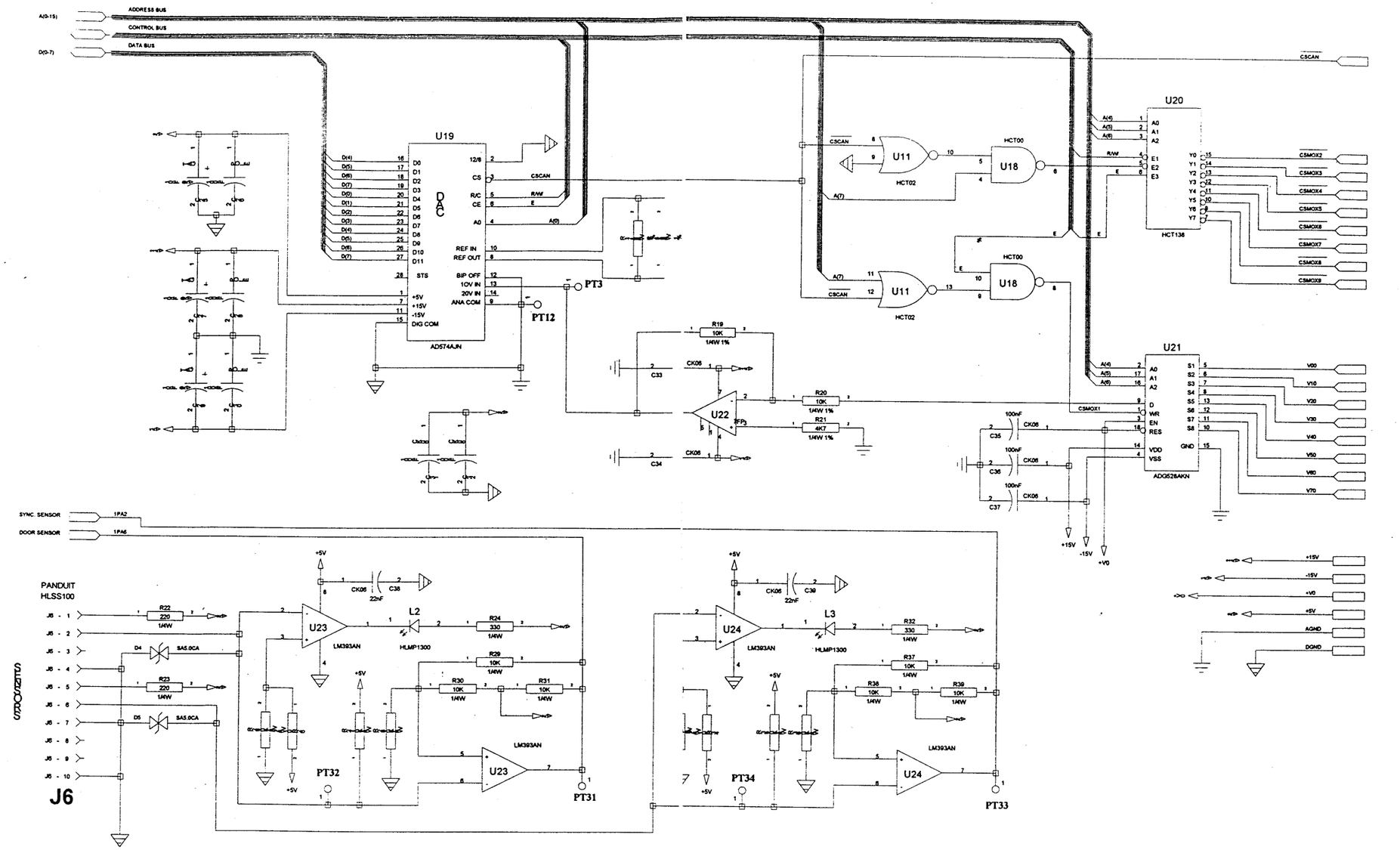
Video BIOS Shadow	: Enabled
C8000-CBFFF Shadow	: Enabled
CC000-CFFFF Shadow	: Enabled
D0000-D3FFF Shadow	: Disabled
D4000-D7FFF Shadow	: Disabled
D8000-DBFFF Shadow	: Disabled
DC000-DFFFF Shadow	: Disabled
E0000-E3FFF Shadow	: Disabled
E4000-E7FFF Shadow	: Disabled
E8000-EBFFF Shadow	: Disabled
EC000-EFFFF Shadow	: Disabled

ESC : Quit ↑ ↓ → : Select Item
F1 : Help PU/PD/+/- : Modify
F5 : Old Values (Shift)F2 : Color
F6 : Load BIOS Defaults
F7 : Load Setup Defaults

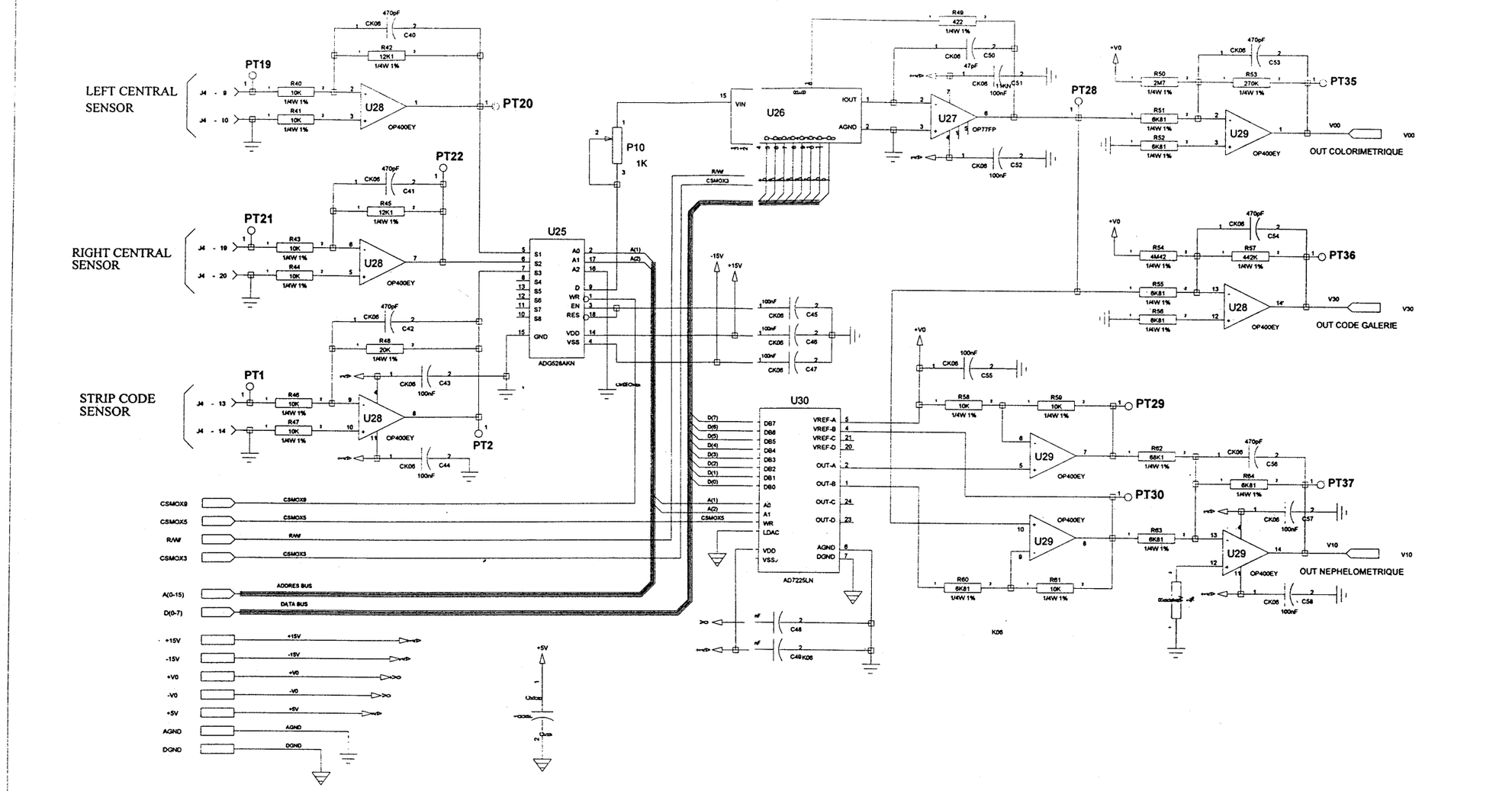
450 0626A SETUP


ADDRESS BUS A(0-15)
DATA BUS D(0-7)
CONTROL BUS
U1
MC6809P
CPU
U2
27C256
EPROM
U3
CAT28C64AP-20
EEPROM
U4
uPD43256BCZ-70LL
RAM1
U5
uPD43256BCZ-70LL
RAM2
U6
PALCE22V10H-25PC
MEMORY PAGE
2CA2
CSRAM1
CSRAM2
CSROM1
CSPIA
CSACIA
CSCAN
CSE2ROM
U7
R6551AP
ACIA
U8
U9
LT1081CN
U10
HCT00
U11
HCT02
U12
MC34064P-5
PT23
RS1
RS2
RS3
RS4
10K
Y1
4 MHz
Y2
1.8432MHz
R3
4N7
1/4W
R4
R5
10K
1/4W
C6
C7
C8
C9
C10
C11
C12
C13
10uF_35V
TAG
+5V
BS2
J7
T.B 622-1024ES
RS 232
bioMerieux Italia S.p.A.
Ponte a Ema FIRENZE
BOARD COM GEST 2
450 627A
1 di 5

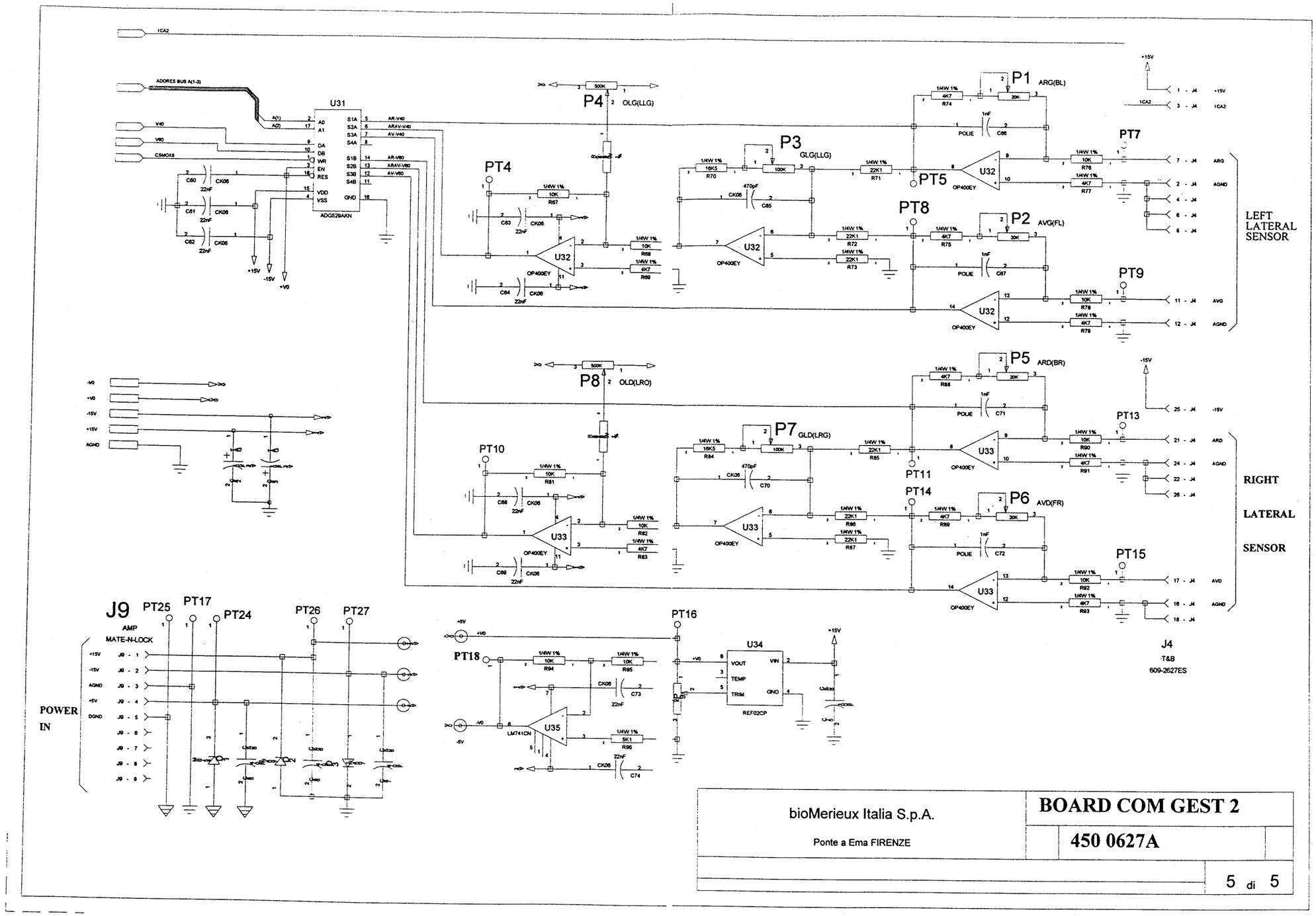

J3
T&B
622-2624ES
BOARD POWER
CONTROL BUS
ADDRESS BUS
DATA BUS
A0-A15
D0-D7
U13
VIA 1
R6522AP
U14
VIA 2
R6522AP
BS3
BS4
L1
PT6
U17
7406
RS5
U15
HCT08
R7
10K
1/4W
U16
7406
R9
R10
R11
R12
R13
R14
1K
R15
R16
470
1/4W
J5
PANDUIT
HLSS 100
SYNC. SENSOR
DOOR SENSOR
MEMORY PAGE
HCT00
U18
R8
4K7
1/4W
bioMerieux Italia S.p.A.
Ponte a Ema FIRENZE
BOARD COM GEST 2
450 0627A
2 di 5

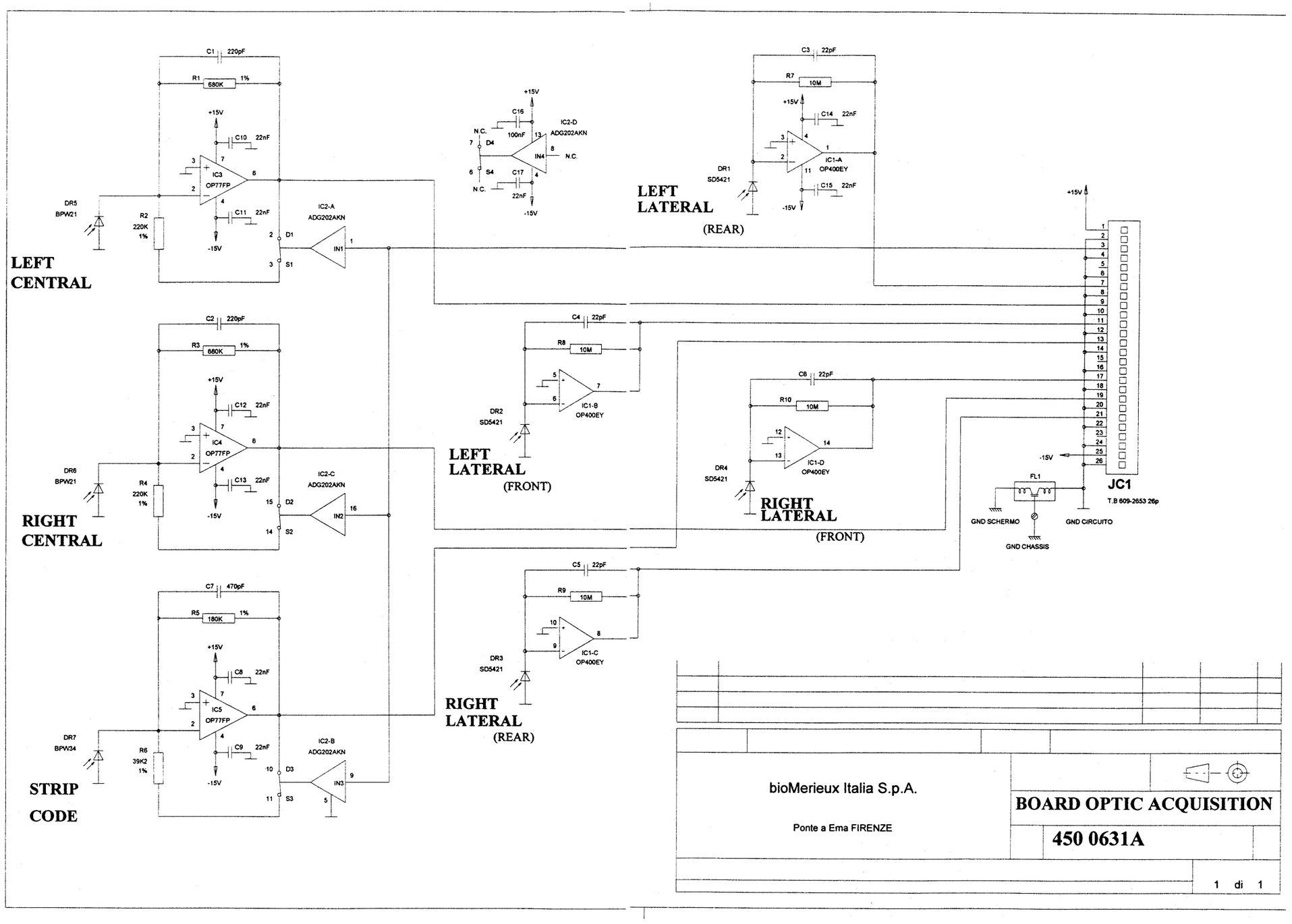


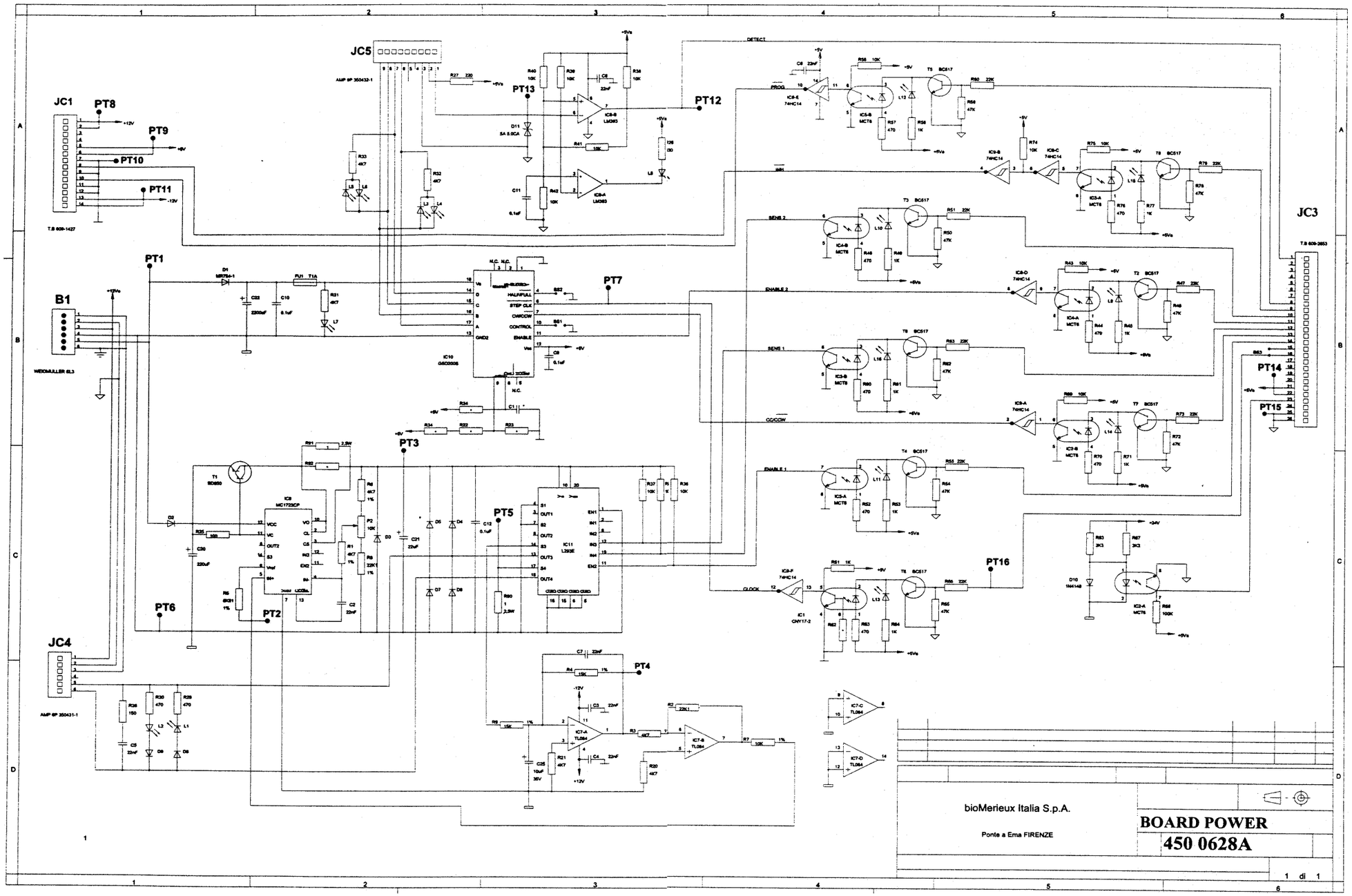
bioMerieux Italia S.p.A. Ponte a Ema FIRENZE	**BOARD COM GEST 2**	
	450 0627A	
		3 di **5**

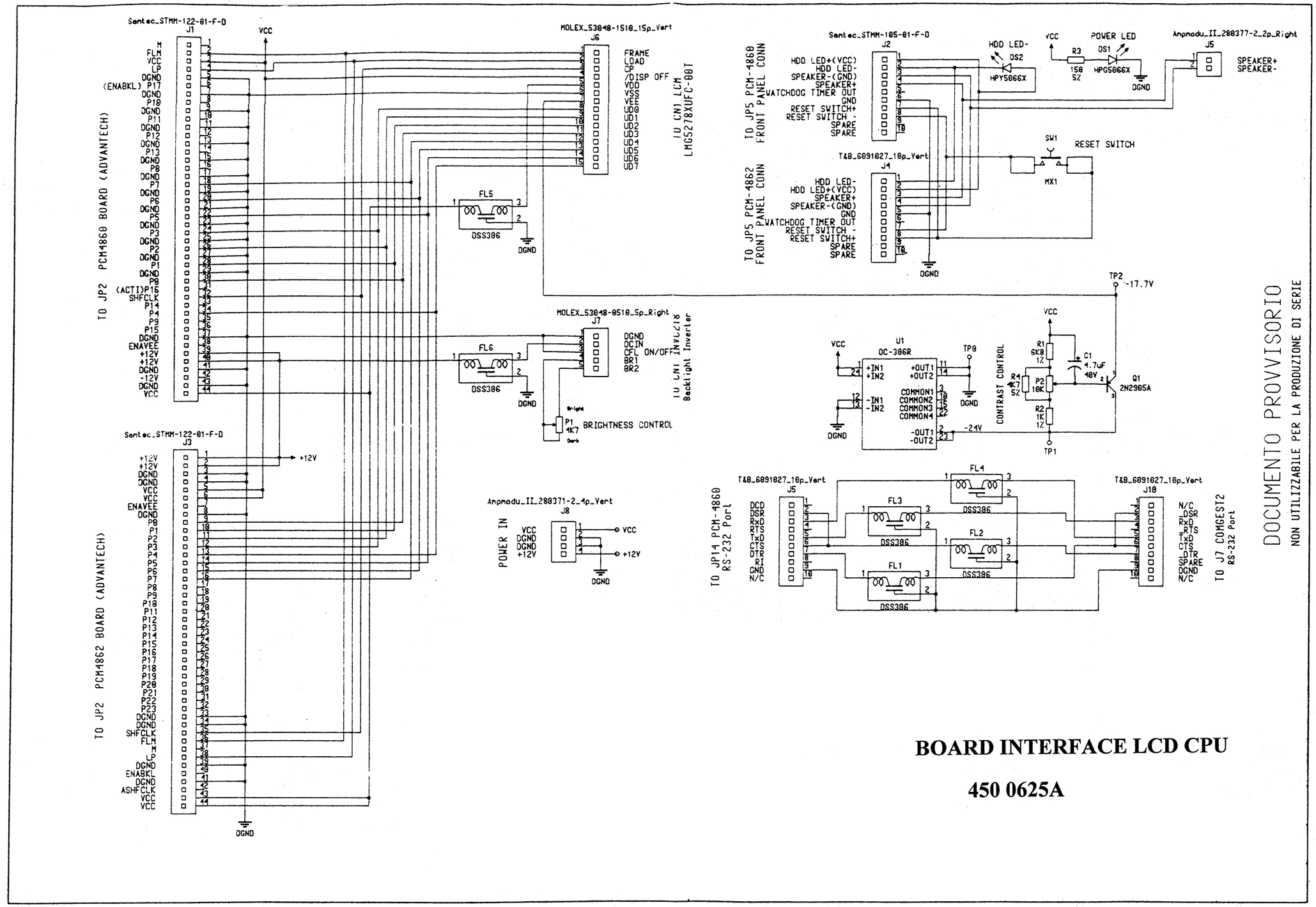


bioMerieux Italia S.p.A. Ponte a Ema FIRENZE	**BOARD COM GEST 2** **450 0627A**
	4 di 5


1CA2
ADDRES BUS A(1-3)
U31
ADG529AKN
P4 OLG(LLG)
P3 GLG(LLG)
P1 ARG(BL)
P2 AVG(FL)
PT4
PT5
PT7
PT8
PT9
U32
OP400EY
LEFT LATERAL SENSOR
P8 OLD(LRO)
P7 GLD(LRG)
P5 ARD(BR)
P6 AVD(FR)
PT10
PT11
PT13
PT14
PT15
U33
RIGHT LATERAL SENSOR
J9
AMP
MATE-N-LOCK
POWER IN
PT25
PT17
PT24
PT26
PT27
PT18
PT16
U34
REF02CP
U35
LM741CN
J4
-T&B
609-2627ES
bioMerieux Italia S.p.A.
Ponte a Ema FIRENZE
BOARD COM GEST 2
450 0627A
5 di 5


LEFT CENTRAL
RIGHT CENTRAL
STRIP CODE
LEFT LATERAL (FRONT)
RIGHT LATERAL (REAR)
LEFT LATERAL (REAR)
RIGHT LATERAL (FRONT)
IC3 OP77FP
IC4 OP77FP
IC5 OP77FP
IC1-A OP400EY
IC1-B OP400EY
IC1-C OP400EY
IC1-D OP400EY
IC2-A ADG202AKN
IC2-B ADG202AKN
IC2-C ADG202AKN
IC2-D ADG202AKN
JC1
T.B 609-2653 26p
GND SCHERMO
GND CIRCUITO
GND CHASSIS
bioMerieux Italia S.p.A.
Ponte a Ema FIRENZE
BOARD OPTIC ACQUISITION
450 0631A
1 di 1


JC1
JC2
JC3
JC4
JC5
PT1
PT2
PT3
PT4
PT5
PT6
PT7
PT8
PT9
PT10
PT11
PT12
PT13
PT14
PT15
PT16
B1
WEIDMULLER BL3
T.B 609-1427
T.B 609-2653
AMP 6P 350431-1
DETECT
PROG
WR1
SENS 2
ENABLE 2
SENS 1
CO/COIN
ENABLE 1
CLOCK
bioMerieux Italia S.p.A.
Ponte a Ema FIRENZE
BOARD POWER
450 0628A
1 di 1


Santec_STMM-122-01-F-D
J1
TO JP2 PCM4860 BOARD (ADVANTECH)
VCC
(ENABKL) P17
(ACTI)P16
SHFCLK
ENAVEE
DGND
MOLEX_53048-1510_15p_Vert
J6
FRAME
LOAD
CP
/DISP OFF
VDD
VSS
VEE
UD0
UD1
UD2
UD3
UD4
UD5
UD6
UD7
TO LCM
LM6S278XUFC-00T
FL5
DSS306
MOLEX_53048-0510_5p_Right
J7
DGND
DCIN
CFL ON/OFF
BR1
BR2
TO INVERTER
Backlight Inverter
FL6
P1
4K7
BRIGHTNESS CONTROL
Santec_STMM-122-01-F-D
J3
TO JP2 PCM4862 BOARD (ADVANTECH)
+12V
Ampmodu_II_280371-2_4p_Vert
J8
POWER IN
Santec_STMM-105-01-F-D
J2
TO JP5 PCM-4860
FRONT PANEL CONN
HDD LED+(VCC)
HDD LED-
SPEAKER-(GND)
SPEAKER+
WATCHDOG TIMER OUT
GND
RESET SWITCH+
RESET SWITCH -
SPARE
HDD LED-
DS2
HPY5066X
POWER LED
DS1
HPG5066X
R3
150
5Z
Ampmodu_II_280377-2_2p_Right
J5
SPEAKER+
SPEAKER-
T&B_6891027_18p_Vert
J4
SW1
RESET SWITCH
MX1
TP2
-17.7V
U1
OC-306R
+IN1
+IN2
-IN1
-IN2
+OUT1
+OUT2
COMMON1
COMMON2
COMMON3
COMMON4
-OUT1
-OUT2
TP0
-24V
CONTRAST CONTROL
R1
6K8
1Z
C1
4.7uF
40V
R4
4K7
5Z
P2
10K
R2
1K
1Z
Q1
2N2905A
TP1
FL4
FL3
FL2
FL1
DSS306
J5
TO JP14 PCM-4860
RS-232 Port
DCD
DSR
RXD
RTS
TXD
CTS
DTR
RI
GND
N/C
J10
N/C
DSR
RXD
RTS
TXD
CTS
DTR
SPARE
DGND
N/C
TO J7 COMGEST2
RS-232 Port
DOCUMENTO PROVVISORIO
NON UTILIZZABILE PER LA PRODUZIONE DI SERIE
BOARD INTERFACE LCD CPU
450 0625A

CHAPTER 10 - APPENDIX

MAINTENANCE SOFTWARE

INTRODUCTION

The following topics are presented in this chapter:

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GETTING STARTED	10-6
OVERVIEW	10-7
• Selecting a Menu	10-7
• Selecting a Command	10-7
• Menu System Commands	10-9
• New ATB 1525 Maintenance Software (ATB 1525 N)	10-9
• *ATB 1525* Maintenance Software	10-18

INTRODUCTION

To perform adjustment, diagnosis and control operations correctly, it is necessary to use the Colorimetric Adjustment Kit.

This kit includes a 0.3 O.D. neutral filter, a precision screwdriver and maintenance software. The software should be used on any IBM compatible computer.

You are advised to attend a level 1 maintenance training session before using this software.

GETTING STARTED

Hardware Requirements

- An IBM Personal Computer or one that is compatible.
- A monochrome or colour monitor.

Software Requirements

The Maintenance Software runs on the following operating systems:

- Version 3.0 or a later version of the PC-DOS or MS-DOS operating system.

Running the Maintenance Software for *mini API*

To use the Maintenance Software,

- Put the floppy disk in the disk drive.
- Switch on ***mini API***.

Before using the Maintenance Software make sure the tray is in the OUT position (see the ATB 1525 Maintenance Software Module, option **F9**).

Selecting a Menu

You can select a menu using the <↓> and <↑> arrows.

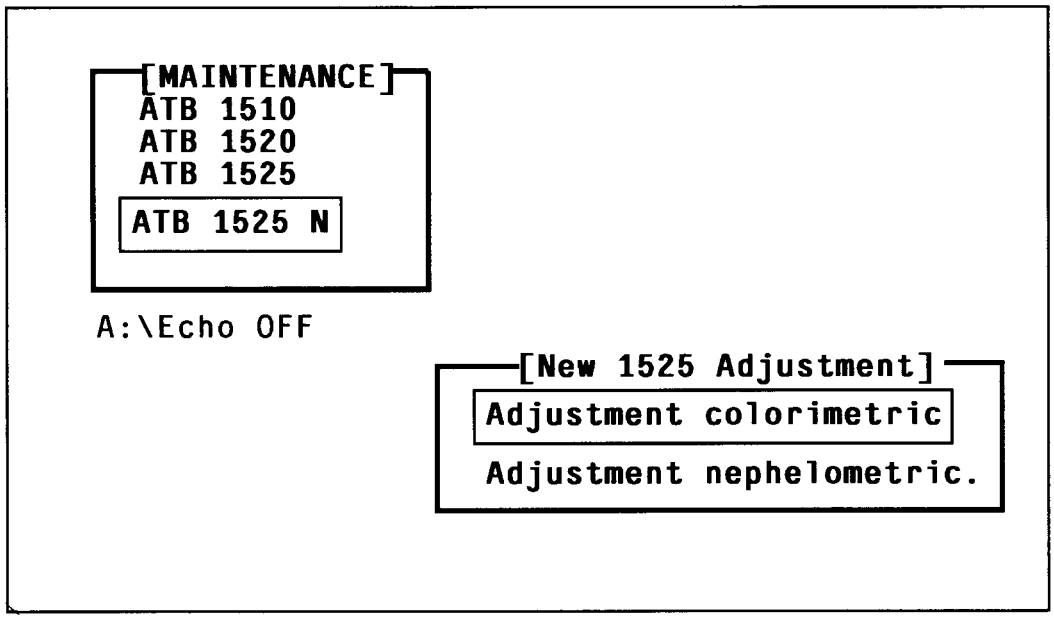


Figure 10-1 Menu Screen

Selecting a Command

New *ATB 1525* Maintenance Software

You can select a command by pressing a function key.

If a command requires additional choices, the program will prompt you.

Key to Press	Activity
<F1>	Allows entry of the reader module's serial number.
<F2>	Enables access to automatic and manual adjustment of the reader module.
<F3>	Reading in Colorimetric or Nephelometric mode.
<END>	Exits Maintenance Software and returns to Menu window.

ATB 1525 Maintenance Software

You can select a command by pressing a function key.

If a command requires additional choices, the program will prompt you.

Key to Press	Activity
<F1>	Enables you to obtain help on different parts of the software.
<F2>	Alarms.
<F3>	Allows you to change the active filter of the reader.
<F4>	Enables you to switch the reader's lamp ON and OFF.
<F5>	Allows access to the adjustment menu for the nephelometric mode.
<F6>	Enables you to make a static reading with display in real time.
<F7>	Enables you to display the previous reading table if there is a reading.
<F8>	Enables you to display the current table after having displayed the previous one.
<F9>	The options menu gives you access to the different features of the maintenance software.
<F10>	Reading in Colorimetric or Nephelometric mode.
<END>	Exits the Maintenance Software and returns you to the Menu window.

Menu System Commands

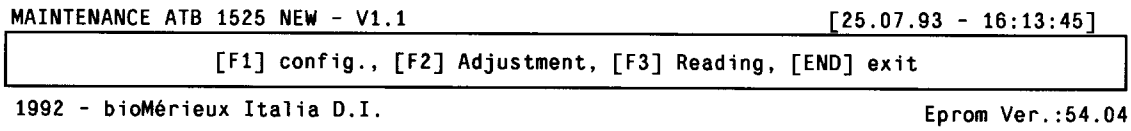
This section contains step-by-step instructions on how to perform each maintenance task in the menu system. It describes each command in the order it appears on the screen.

The bottom line on the menu system screen contains a list of horizontal commands. A list of subcommands appears in the middle or on the right of the screen.

New ATB 1525 Maintenance Software (ATB 1525 N)

This software is a special program to enable the adjustment of the numerical potentiometres on the new ATB 1525 Reader.

The software does not include all the functions. To perform the nephelometric adjustment you must use the Maintenance Software for ATB 1525 (see page10-17).


MAINTENANCE ATB 1525 NEW - V1.1
[25.07.93 - 16:13:45]
[F1] config., [F2] Adjustment, [F3] Reading, [END] exit
1992 - bioMérieux Italia D.I.
Eprom Ver.:54.04

Configuration Command <F1>

The Configuration Command allows you to enter the reader's serial number or any word with a maximum of 8 characters.

Procedure:

– Press the **<F1>** function key.

The message

Enter Instrument S/N

appears on the screen.

– Enter the serial number and then press **<ENTER>** to validate.

Adjustment Command <F2>

This function gives access to the Automatic Adjustment Menu with the new ATB 1525 Reader.

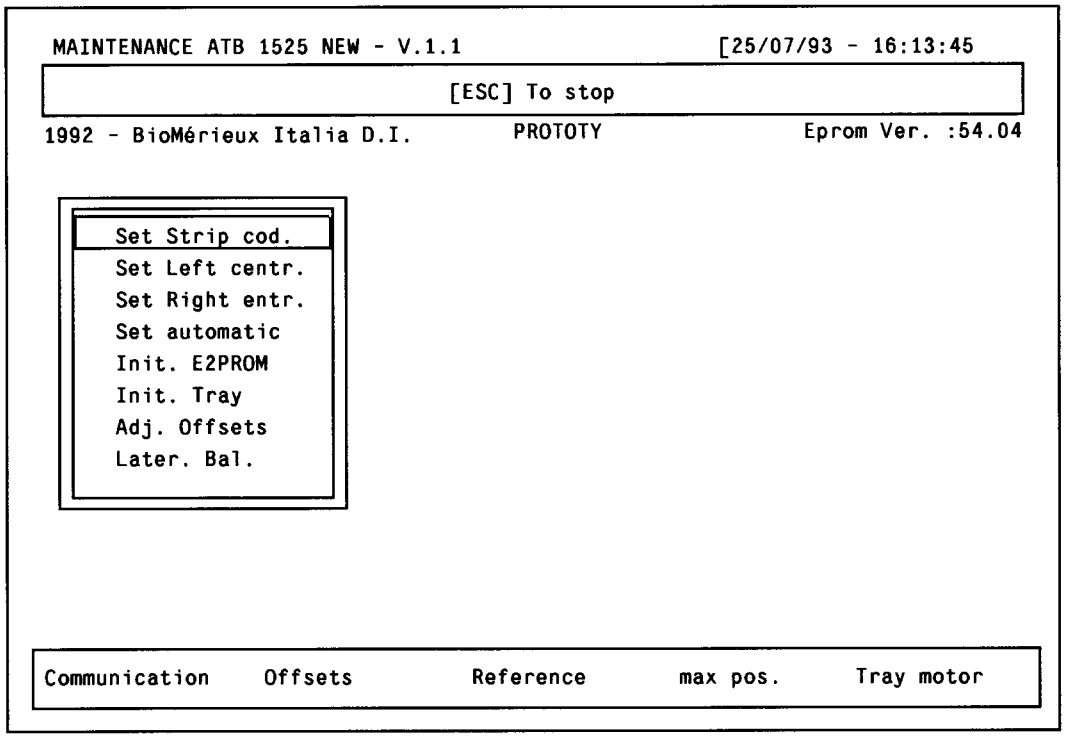
With this program you cannot access the Nephelometric Adjustment.

Procedure:

– Press the **<F2>** function key.

The Adjustment screen appears with several choices.

– Move the arrow keys to highlight the option you have selected and press **<ENTER>**.



Set Strip Cod.

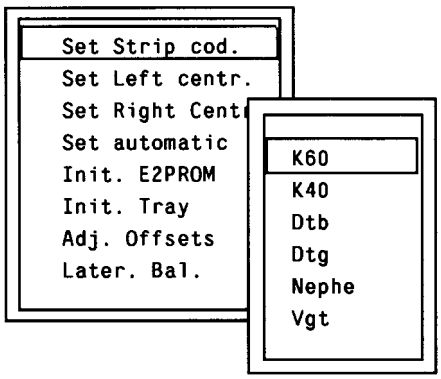
This function allows you to manually change the gain attenuation value of each filter.

Procedure:

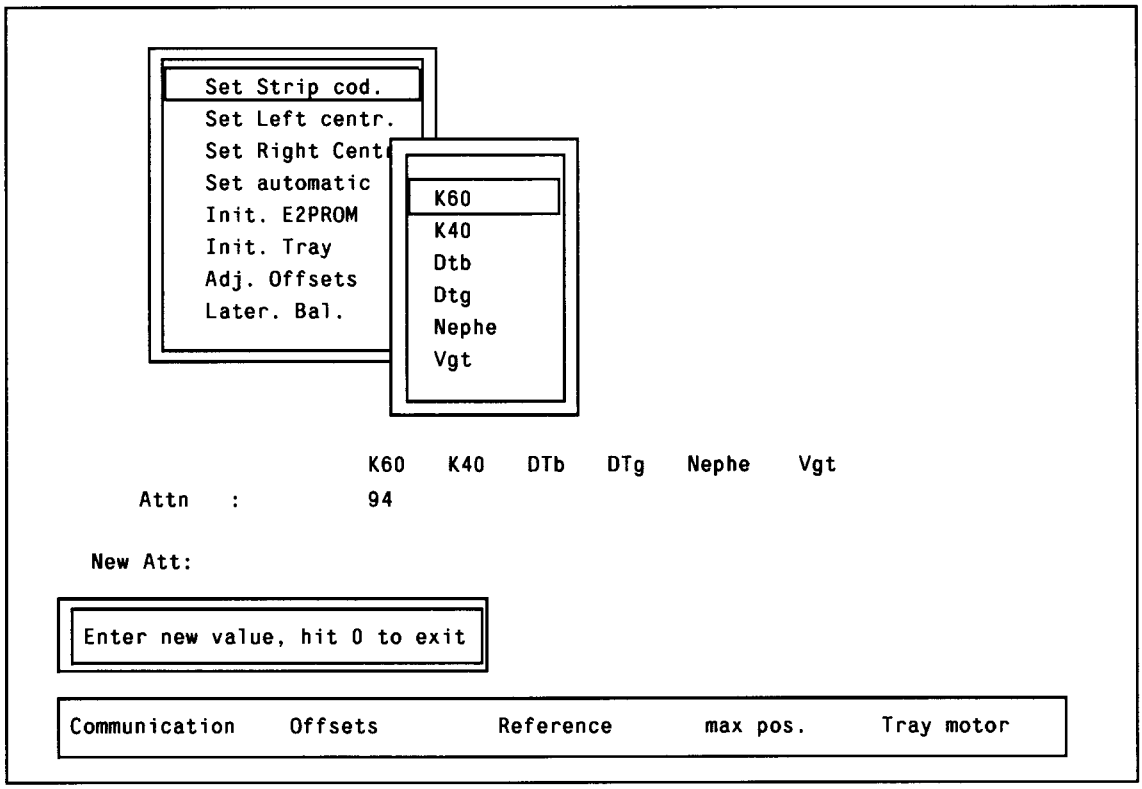
– Press **<ENTER>** on **Set Strip Cod**.

The filter screen appears with several choices.

– Move the arrow keys to highlight the option you have selected and press **<ENTER>**.



– Enter the new attenuation value for the chosen filter or press 0 to exit.



Set Left centr.

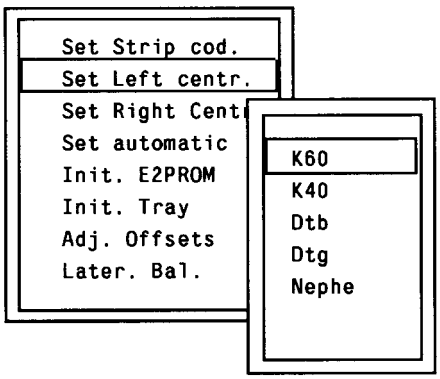
This function allows you to manually change the gain attenuation value of each filter for the left-hand channel.

Procedure:

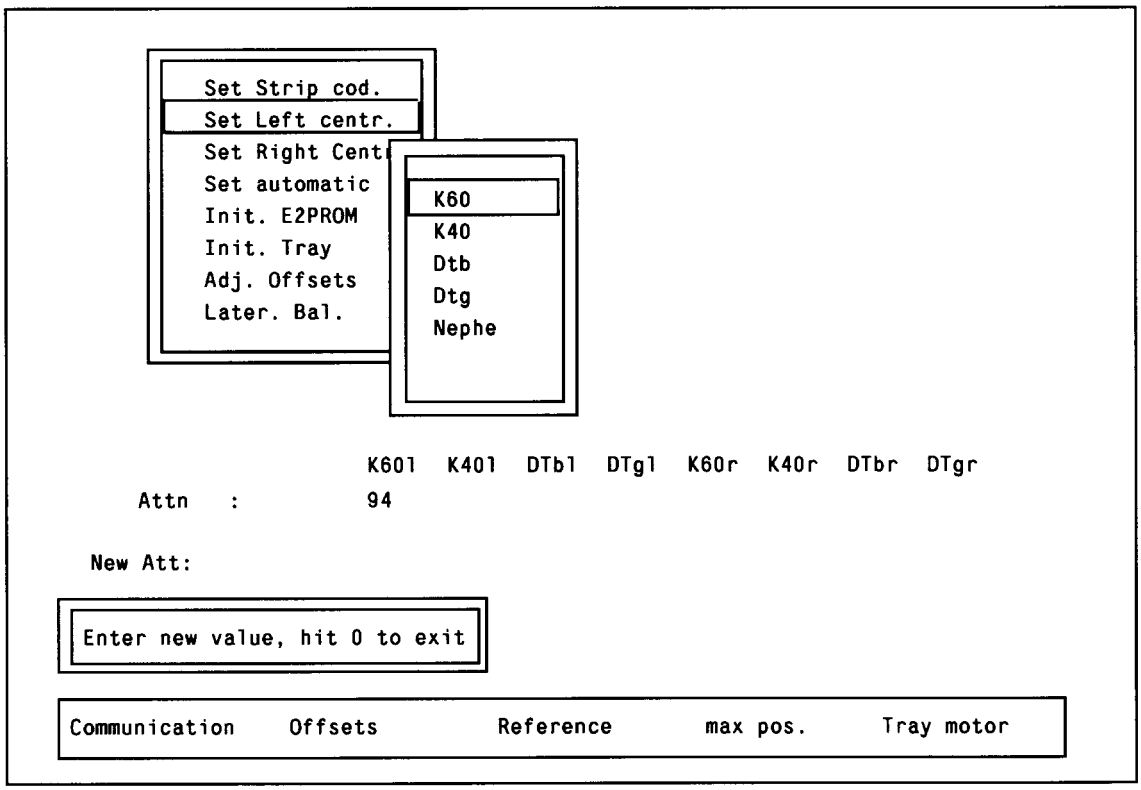
– Press **<ENTER>** on **Set Left Centr.**

The filter screen appears with several choices.

– Move the arrow keys to highlight the option you have selected and press **<ENTER>**.



– Enter the new attenuation value for the chosen filter or press 0 to exit.



Set Right Centr.

This function allows you to manually change the gain attenuation value of each filter for the right-hand channel.

The procedure is the same as for **Set Left. Centr.**

Set automatic

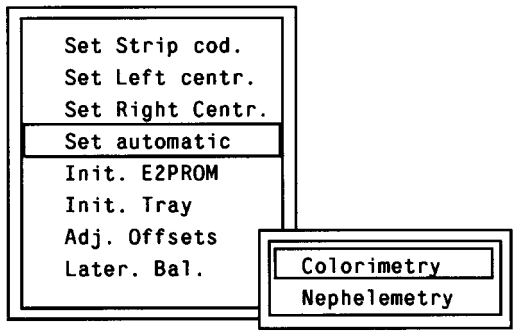
This function allows you to automatically adjust all the central gains in colorimetry and nephelometry.

Colorimetric Procedure:

– Press **<ENTER>** on **Set automatic**.

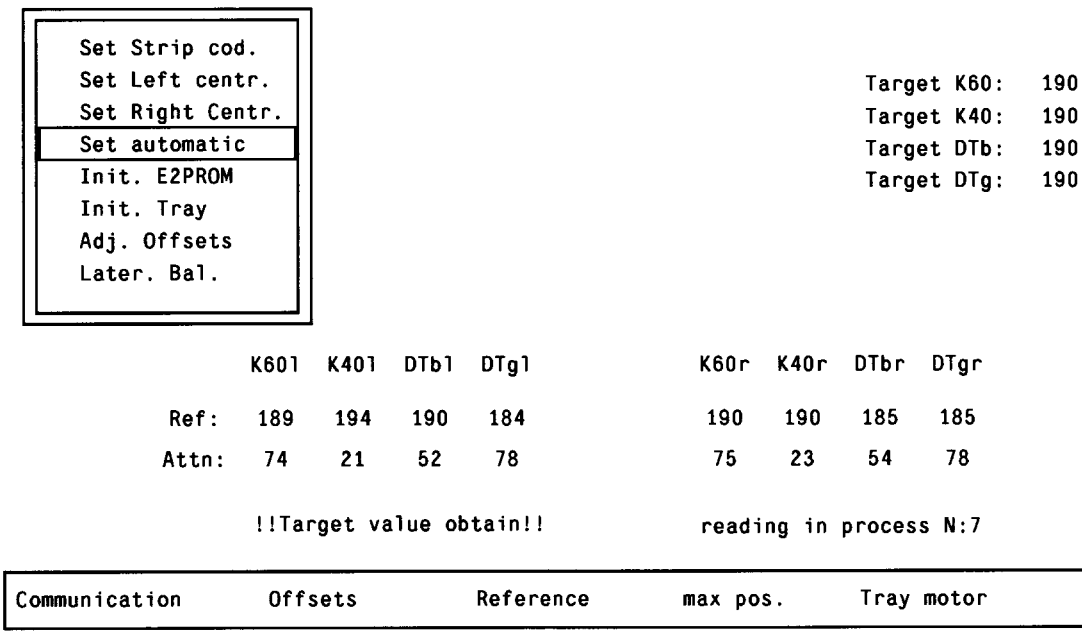
– Select the **Colorimetry** option.

NOTE : The **Colorimetry** option allows you to obtain the automatic adjustment of the central gain for each filter.



– Enter the reference value (190) for each filter and press **<ENTER>**.

NOTE : The software automatically calculates the attenuation value for each filter and indicates the end of the cycle by the message "**Target value obtain**".



Nephelometric Procedure:

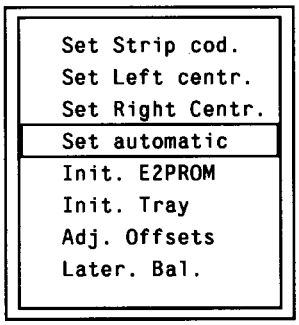
– Press **<ENTER>** on **Set automatic**.

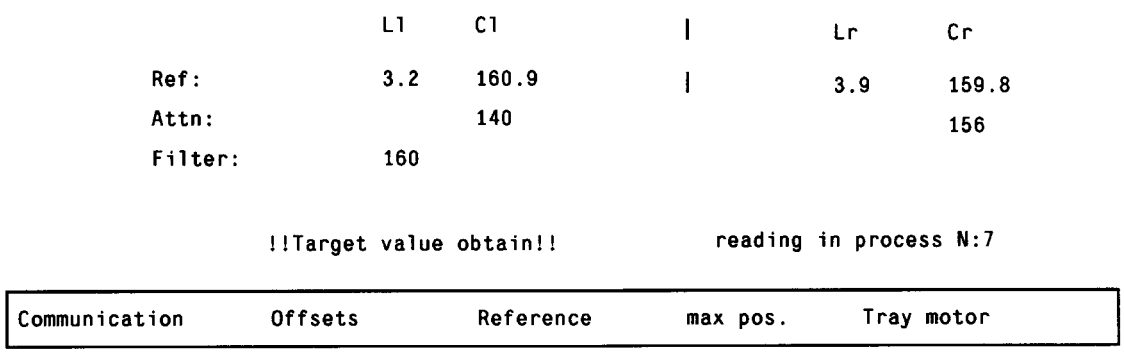
– Select the **Nephelometry** option.

NOTE : The **Nephelometry** option allows you to obtain the automatic adjustment of the central gain for each channel.

– Enter the reference value which is indicated on the Neutral Filter Tool for nephelometric adjustment.

NOTE : The software automatically calculates the attenuation value for the central gain and indicates the end of the cycle by the message "**Target value obtain**".




Ll Cl | Lr Cr
Ref: 3.2 160.9 | 3.9 159.8
Attn: 140 156
Filter: 160
!!Target value obtain!!
reading in process N:7
Communication Offsets Reference max pos. Tray motor

Init. Tray

This function enables initialisation of the tray after the automatic adjustment of the gains in colorimetric mode (check the maximum position).

Procedure:

– Press **<ENTER>** on **Init. Tray**.

NOTE : The software runs automatically and starts a reading in colorimetric mode.

You cannot see the result on the screen since the computing is done in the memory.

Adjusting Offsets

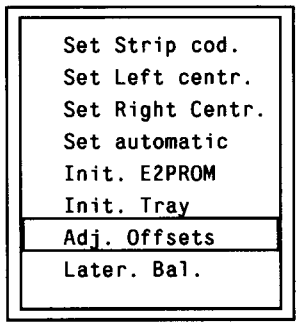
This function allows you to automatically adjust the central offsets for the nephelometric mode in nephelometry.

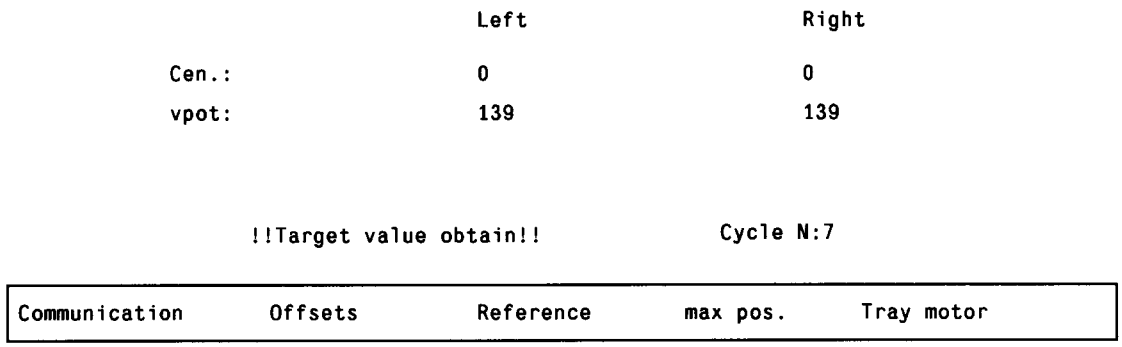
Procedure:

– Press **<ENTER>** on **Adj. Offsets**.

The message "**Check the good position of the tray, then hit enter**" appears.

– Follow the instructions on the screen.





NOTE : The software runs automatically and starts a reading in colorimetric mode.

You can see the modification of the offset value in real time on the screen. The result will automatically be saved in E2PROM.

Lateral Balancing

This function enables the lateral adjustment of the rear and front photodiodes on each channel. It is the same as the function in the ATB 1525 Maintenance Software (Function F5 and lateral balancing option: see page 10-21).

Adjustment Command <F3>

This function gives access to the Reading Menu with the new ATB 1525 Reader.

Procedure:

– Press the **<F3>** function key.

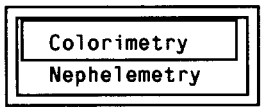
A reading screen appears with several options.

– Move the arrow keys to highlight the option you have selected and press **<ENTER>**.

Colorimetric Reading

This function enables the validation of the automatic adjustment of the attenuation gain for each filter.

– Put the Neutral Filter Tool on the tray.



	K60l	K40l	DTbl	DTgl	K60r	K40r	DTbr	DTgr
Min:	211	250	205	209	212	204	204	209
Max:	212	206	206	210	214	206	206	210
Ave:	212	205	205	209	212	205	205	209
Filter:	213	207	206	212	213	207	206	212
(%)	0.47	0.49	0.49	0.48	0.97	0.97	0.97	0.48
Ref:	190	194	191	185	189	189	185	186
Of:	12	12	12	12	12	12	12	12
Strip Code	#000000							

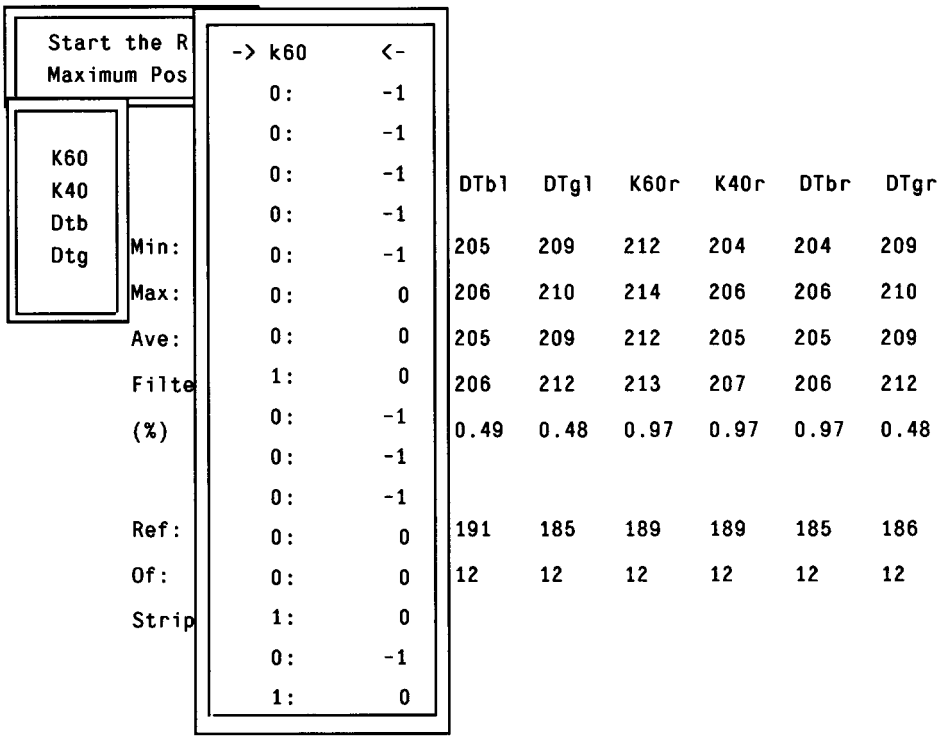
– Start the reading and check the results with the table above.

NOTE : After a colorimetric reading you can check the maximum position values for each filter as below.

– Press **<ENTER>** on the **Colorimetry** option.

– Choose the **Maximum Position** option and then press **<ENTER>**.

– Using the arrow, select the filter you wish to check.

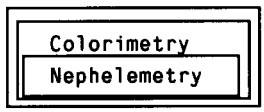


Nephelometric Reading

This function enables the validation of the automatic adjustment of the attenuation gain for nephelometric mode.

– Put the Neutral Filter Tool on the tray.

– Start the reading and check the results with the table below.



	Ll	Cl		Lr	Cr
Min:	3	161		3	160
Max:	4	162		4	161
Ave:	3	161		4	160
Filter:		160			160

Strip Code #000000

Escape Command <End>

This function allows you to quit the program and return to the main menu (see page 10-7).

ATB 1525 Maintenance Software

This software is a special program allowing you to adjust the ATB 1525 Reader.

It does not include all the functions. To perform the colorimetric adjustment you must use the Maintenance Software for the new ATB 1525 (see page 10-9).

Help Command <F1>

The Help Command describes how to use the on-line help facility in the maintenance software.

To display the on-line help text, proceed as follows.

– Press the **<F1>** function key.

A help screen appears with several choices.

– Move the arrow keys to highlight the help text you desire.

- Colorimetry
  Table of measurements indicating the allowances.

- Nephelometry
  Table for O.D. of bacteria used for the adjustment and allowances.

- All
  Function of each key available with the maintenance software.

– Press **<ESC>** to quit the help facility.

NOTE : Depending on what part of the software you are using i.e. Colorimetry, Nephelometry etc., the corresponding help menu is automatically commuted.

Alarms Command <F2>

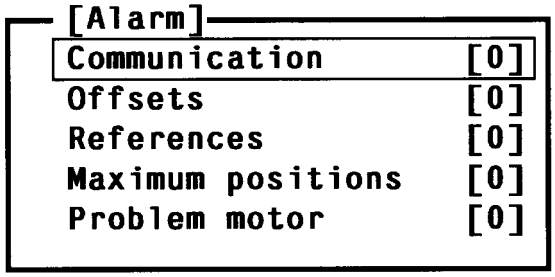
The Alarms Command gives the list of alarms and indicates whether they are active or not (0 = Not active, 1 = Active).

Procedure

– Press the **<F2>** function key.

The Alarms screen appears with several options.

– Highlight the Alarm you want by moving the arrow keys and then press **<ENTER>**.



Communication

If the alarm is active the message "**Uncorrect communication!!!**" appears.
If the reader is not connected, the program gives the following message after two TIME OUTs:

Command : [E]
ATB 1525 does not answer!!!

Offset

After a colorimetric reading, the program displays the table of offsets for each filter and each channel.

Reference

After a colorimetric reading, the program displays the table of references for each filter and each channel.

Maximum positions

After a colorimetric or nephelometric reading the program displays the values of the maximum position for each filter in colorimetric or nephelometric mode.

Problem motor

If the tray does not move or if the filter motor does not run, the program gives the following message:

Command : [D]
ATB 1525 is useless.

Filters Command <F3>

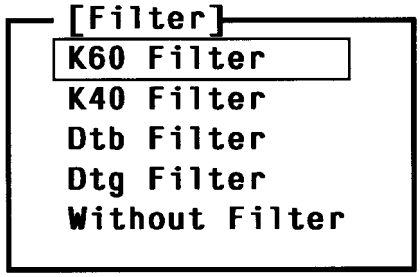
This function enables you to change the reader's active filter.

Procedure

– Press the **<F3>** function key.

The Filter screen appears with several options.

– Highlight the Filter you want by moving the arrow keys and then press **<ENTER>**.



Lamp Command <F4>

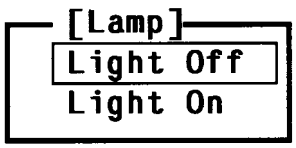
This function enables you to switch the reader's lamp ON or OFF.

Procedure

– Press the **<F4>** function key.

The Lamp screen appears with two options.

– Highlight the state you want by moving the arrow keys and then press **<ENTER>**.



Adjustment Command <F5>

This function enables you to access the nephelometric adjustment menu with the ATB 1525 reader.

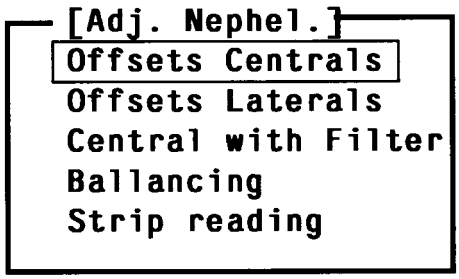
With this program you cannot access the colorimetric adjustment menu.

Procedure

– Press the **<F5>** function key.

The Adjustment screen appears with several options.

Highlight the option you want by moving the arrow keys and then press **<ENTER>**.



Offsets Centrals

Enables you to obtain the correct value for the offset (respect the value displayed in brackets).

Offsets Laterals

Enables you to obtain the correct value for the offset (respect the value displayed in brackets).

Central with Filter

Enables the adjustment of the central gain in nephelometric mode using the Neutral Filter from the colorimetric kit (respect the value displayed in brackets).

Ballancing

The tray goes back and forth inside the reader for one minute to allow the adjustment of the signal between the rear and front photodiode of each channel.

Strip reading

Enables the reading of a strip to check the adjustment in nephelometric mode.

Acquisition Command <F6>

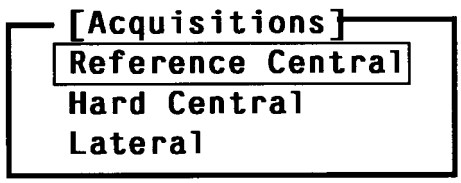
This function enables you to access the acquisition menu with the ATB 1525 reader. It also allows you to perform a static reading with display in real time of the values read on the reference, lateral or raw central.

Procedure

– Press the **<F6>** function key.

The Acquisitions screen appears with several options.

– Highlight the option you want by moving the arrow keys and then press **<ENTER>**.



Reference Central

Enables you to check the gain of the strip code photodiode.

Hard Central

Enables you to check the gain of the central photodiode for each channel.

Lateral

Enables you to check the gain of the lateral photodiode for each channel.

Previous Table Command <F7>

When successive readings have been performed, the **<F7>** function enables you to display the previous table of measurements in colorimetric or nephelometric mode.

Current Table Command <F8>

This function enables you to display the current table after having displayed the previous one with the **<F7>** function in colorimetric or nephelometric mode.

Options Command <F9>

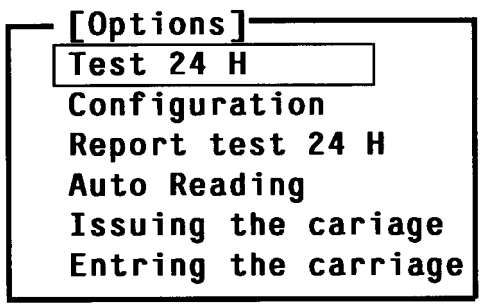
This function enables you to access the Maintenance Software features.

Procedure

– Press the **<F8>** function key.

The Features screen appears with several options.

– Highlight the option you want by moving the arrow keys and then press **<ENTER>**.



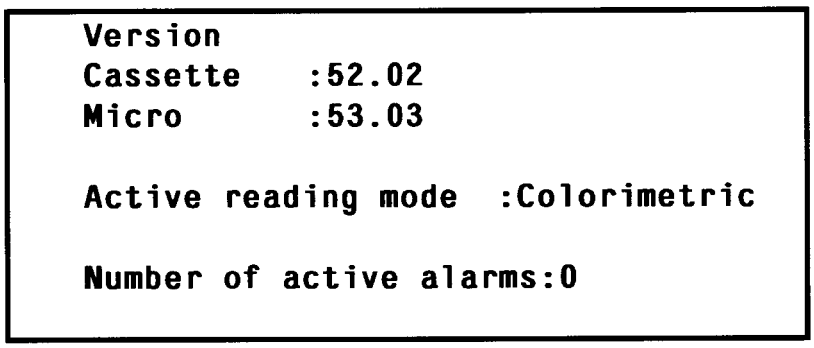
Test 24 H

Allows the system to enter a cycle of continuous tests of the colorimetry which can be set up as follows:

Min. time = X1 (min. time between two readings).
Max. time = X2 (max. time between two readings).

Configuration

Enables or disables the information from the firmware on the first screen of the Maintenance Software during the communication between the reader and the computer.



Reading Command <F10>

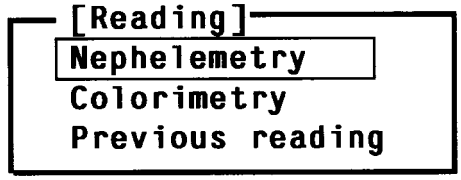
This function enables you to perform colorimetric or nephelometric readings or to call for the last reading stored in the reader's memory.

Procedure

– Press the **<F10>** function key.

The Reading screen appears with several options.

– Highlight the option you want by moving the arrow keys and then press **<ENTER>**.



End Command <End>

This function enables you to exit the program.

To quit answer <O> at the question: "**Do you really want to quit?**".

CHAPTER 11

GLOSSARY

INTRODUCTION

This chapter contains a Glossary of the main terms used in this manual, listed in alphabetical order.

GLOSSARY

ACIA	Asychronous Communication Interface Adaptor.
Analogue Converter	Electronic component allowing conversion of measured values into interpretable results.
Board Back Light LCD	LCD Back Light Board.
Board Detection Filter Holder	Filter Holder Detection Board.
Board Detection Tray	Tray Detection Board.
Board Interface Serial LCD CPU	LCD CPU Serial Interface Board.
Board Optic Acquisition	Optic Acquisition Board.
Board Power	Power Board.
CPU	Central Processing Unit. The portion of a computer that is responsible for processing software instructions.
EEPROM	Electrical Erasable Programmable Read Only Memory.
EPROM	Erasable Programmable Read Only Memory.
Escherichia coli	Reference microorganism used in the adjustment of the reader module.
Photosensor	Sensor enabling a light source received to be transformed into a source of electrical current.
O.D.	Optical Density. The result of the measurement of a medium through an incident beam of light.
RAM	Random Access Memory.
ROM	Read Only Memory.
Strip	A set of standardised, miniaturised tests on a plastic support.
Tool Cleaner	Cleaning tool.
VIA	Versatile Interface Adaptor.

CHAPTER 12

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